Firepower®

FP-125
FP-135
FP-165

MINI MIG

PORTABLE MIG WELDER

Art # A-09075

Operating Manual

Revision: AA Issue Date: March 19, 2009 Manual No.: 0-5123

Operating Features:

GMAW FCAW | 120 AMP | 130 AMP | 160 AMP | 115 V | 230 V | 1 PHASE | CV | DC

WE APPRECIATE YOUR BUSINESS!

Congratulations on your new Thermal Arc product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency call 1-800-752-7621, or visit us on the web at **www.Thermalarc.com.**

This Operating Manual has been designed to instruct you on the correct use and operation of your Thermal Arc product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

YOU ARE IN GOOD COMPANY!

The Brand of Choice for Contractors and Fabricators Worldwide.

Thermal Arc is a Global Brand of Arc Welding Products for Thermadyne Industries Inc. We manufacture and supply to major welding industry sectors worldwide including; Manufacturing, Construction, Mining, Automotive, Aerospace, Engineering, Rural and DIY/Hobbyist.

We distinguish ourselves from our competition through market-leading, dependable products that have stood the test of time. We pride ourselves on technical innovation, competitive prices, excellent delivery, superior customer service and technical support, together with excellence in sales and marketing expertise.

Above all, we are committed to develop technologically advanced products to achieve a safer working environment within the welding industry.

WARNINGS

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Operating Manual Number 0-5123 for:

FirePower 125 Mini MIG System MIG Welder	Part No. 1444-0324
FirePower 135 Mini MIG System MIG Welder	Part No. 1444-0326
FirePower 165 Mini MIG System MIG Welder	Part No. 1444-0328

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Publication Date: March 19, 2009

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Equipment Serial #: _____

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SECTION 1:
SAFETY INSTRUCTIONS AND WARNINGS

WARNING

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the American National Standard Z49.1 entitled: SAFETY IN WELDING AND CUTTING. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

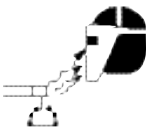
1.01 Arc Welding Hazards

WARNING

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semi-automatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

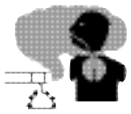
1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.



WARNING

ARC RAYS can burn eyes and skin; NOISE can damage hearing. Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.



WARNING

FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

WARNING

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.

Welding or Cutting Operation	*Electrode Size Metal Thickness or Welding Current*	*Filter Shade No.*	*Welding or Cutting Operation*	*Electrode Size Metal Thickness or Welding*	*Filter Shade No.*
Torch soldering		2	**Gas metal-arc welding (MIG)**		
Torch brazing		3 or 4	Non-ferrous base metal	All	11
Oxygen Cutting			Non-ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding	All	12
Medium	1 to 6 in., 25-150 mm	4 or 5	(TIG)	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Atomic hydrogen welding	All	12
Gas welding			Carbon arc welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Plasma arc welding		
Medium	1/8 to 1/2 in., 3-12 mm	5 or 6	**Carbon arc air gouging**		
Heavy	Over 1/2 in., 12 mm	6 or 8	Light		12
Shielded metal-arc welding (stick) electrodes	Under 5/32 in., 4 mm	10	Heavy		14
	5/32 to 1/4 in., 4 to 6.4 mm	12	**Plasma arc cutting**		
	Over 1/4 in., 6.4 mm	14	Light	Under 300 Amp	9
			Medium	300 to 400 Amp	12
			Heavy	Over 400 Amp	14

WARNING

FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.

WARNING

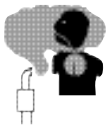
CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

WARNING

Engines can be dangerous.



WARNING

ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

WARNING

ENGINE FUEL can cause fire or explosion.

Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.

WARNING

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.

WARNING

SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and –) on batteries.

WARNING

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.

LEAD WARNING

This product contains chemicals, including lead, or otherwise produces chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. Wash hands after handling. (California Health & Safety Code § 25249.5 et seq.)

NOTE

Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures.

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.

ABOUT PACEMAKERS:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

1.02 Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

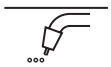
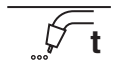
Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.03 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
	Amperage
	Voltage
	Hertz (cycles/sec)
	Frequency
	Negative
	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
115V 15A	Receptacle Rating- Auxiliary Power

	Single Phase
	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
	Duty Cycle
	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
V	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
 t	Spot Time
t1	Preflow Time
t2	Postflow Time
	2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.
	4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.
t	Burnback Time
IPM	Inches Per Minute
MPM	Meters Per Minute
	Art # A-04130

1.04 Precautions De Securite En Soudage A L'arc

MISE EN GARDE

LE SOUDAGE A L'ARC EST DANGEREUX

PROTEGEZ-VOUS, AINSI QUE LES AUTRES, CONTRE LES BLESSURES GRAVES POSSIBLES OU LA MORT. NE LAISSEZ PAS LES ENFANTS S'APPROCHER, NI LES PORTEURS DE STIMULATEUR CARDIAQUE (A MOINS QU'ILS N'AIENT CONSULTE UN MEDECIN). CONSERVEZ CES INSTRUCTIONS. LISEZ LE MANUEL D'OPERATION OU LES INSTRUCTIONS AVANT D'INSTALLER, UTILISER OU ENTRETENIR CET EQUIPEMENT.

Les produits et procédés de soudage peuvent sauser des blessures graves ou la mort, de même que des dommages au reste du matériel et à la propriété, si l'utilisateur n'adhère pas strictement à toutes les règles de sécurité et ne prend pas les précautions nécessaires.

En soudage et coupage, des pratiques sécuritaires se sont développées suite à l'expérience passée. Ces pratiques doivent être apprises par étude ou entraînement avant d'utiliser l'equipement. Toute personne n'ayant pas suivi un entraînement intensif en soudage et coupage ne devrait pas tenter de souder. Certaines pratiques concernent les équipements raccordés aux lignes d'alimentation alors que d'autres s'adressent aux groupes électrogènes.

La norme Z49.1 de l'American National Standard, intitulée "SAFETY IN WELDING AND CUTTING" présente les pratiques sécuritaires à suivre. Ce document ainsi que d'autres guides que vous devriez connaître avant d'utiliser cet équipement sont présentés à la fin de ces instructions de sécurité.

SEULES DES PERSONNES QUALIFIEES DOIVENT FAIRE DES TRAVAUX D'INSTALLATION, DE REPARATION, D'ENTRETIEN ET D'ESSAI.

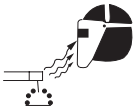
1.05 Dangers relatifs au soudage à l'arc

AVERTISSEMENT

L'ELECTROCUTION PEUT ETRE MORTELLE.

Une décharge électrique peut tuer ou brûler gravement. L'électrode et le circuit de soudage sont sous tension dès la mise en circuit. Le circuit d'alimentation et les circuits internes de l'équipement sont aussi sous tension dès la mise en marche. En soudage automatique ou semi-automatique avec fil, ce dernier, le rouleau ou la bobine de fil, le logement des galets d'entrainement et toutes les pièces métalliques en contact avec le fil de soudage sont sous tension. Un équipement inadéquatement installé ou inadéquatement mis à la terre est dangereux.

1. Ne touchez pas à des pièces sous tension.
2. Portez des gants et des vêtements isolants, secs et non troués.
3 Isolez-vous de la pièce à souder et de la mise à la terre au moyen de tapis isolants ou autres.
4. Déconnectez la prise d'alimentation de l'équipement ou arrêtez le moteur avant de l'installer ou d'en faire l'entretien. Bloquez le commutateur en circuit ouvert ou enlevez les fusibles de l'alimentation afin d'éviter une mise en marche accidentelle.
5. Veuillez à installer cet équipement et à le mettre à la terre selon le manuel d'utilisation et les codes nationaux, provinciaux et locaux applicables.
6. Arrêtez tout équipement après usage. Coupez l'alimentation de l'équipement s'il est hors d'usage ou inutilisé.
7. N'utilisez que des porte-électrodes bien isolés. Ne jamais plonger les porte-électrodes dans l'eau pour les refroidir. Ne jamais les laisser traîner par terre ou sur les pièces à souder. Ne touchez pas aux porte-électrodes raccordés à deux sources de courant en même temps. Ne jamais toucher quelqu'un d'autre avec l'électrode ou le porte-électrode.
8. N'utilisez pas de câbles électriques usés, endommagés, mal épissés ou de section trop petite.
9. N'enroulez pas de câbles électriques autour de votre corps.
10. N'utilisez qu'une bonne prise de masse pour la mise à la terre de la pièce à souder.
11. Ne touchez pas à l'électrode lorsqu'en contact avec le circuit de soudage (terre).
12. N'utilisez que des équipements en bon état. Réparez ou remplacez aussitôt les pièces endommagées.
13. Dans des espaces confinés ou mouillés, n'utilisez pas de source de courant alternatif, à moins qu'il soit muni d'un réducteur de tension. Utilisez plutôt une source de courant continu.
14. Portez un harnais de sécurité si vous travaillez en hauteur.
15. Fermez solidement tous les panneaux et les capots.



AVERTISSEMENT

LE RAYONNEMENT DE L'ARC PEUT BRÛLER LES YEUX ET LA PEAU; LE BRUIT PEUT ENDOMMAGER L'OUIE.

L'arc de soudage produit une chaleur et des rayons ultraviolets intenses, susceptibles de brûler les yeux et la peau. Le bruit causé par certains procédés peut endommager l'ouïe.

1. Portez une casque de soudeur avec filtre oculaire de nuance appropriée (consultez la norme ANSI Z49 indiquée ci-après) pour vous protéger le visage et les yeux lorsque vous soudez ou que vous observez l'exécution d'une soudure.
2. Portez des lunettes de sécurité approuvées. Des écrans latéraux sont recommandés.
3. Entourez l'aire de soudage de rideaux ou de cloisons pour protéger les autres des coups d'arc ou de l'éblouissement; avertissez les observateurs de ne pas regarder l'arc.
4. Portez des vêtements en matériaux ignifuges et durables (laine et cuir) et des chaussures de sécurité.
5. Portez un casque antibruit ou des bouchons d'oreille approuvés lorsque le niveau de bruit est élevé.

AVERTISSEMENT

LES VAPEURS ET LES FUMEES SONT DANGEREUSES POUR LA SANTE.

Le soudage dégage des vapeurs et des fumées dangereuses à respirer.

1. Eloignez la tête des fumées pour éviter de les respirer.
2. A l'intérieur, assurez-vous que l'aire de soudage est bien ventilée ou que les fumées et les vapeurs sont aspirées à l'arc.
3. Si la ventilation est inadequate, portez un respirateur à adduction d'air approuvé.
4. Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consummables, aux revêtements et aux produits nettoyants.
5. Ne travaillez dans un espace confiné que s'il est bien ventilé; sinon, portez un respirateur à adduction d'air. Les gaz protecteurs de soudage peuvent déplacer l'oxygène de l'air et ainsi causer des malaises ou la mort. Assurez-vous que l'air est propre à la respiration.
6. Ne soudez pas à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir avec des vapeurs et former des gaz hautement toxiques et irritants.
7. Ne soudez des tôles galvanisées ou plaquées au plomb ou au cadmium que si les zones à souder ont été grattées à fond, que si l'espace est bien ventilé; si nécessaire portez un respirateur à adduction d'air. Car ces revêtements et tout métal qui contient ces éléments peuvent dégager des fumées toxiques au moment du soudage.

SELECTION DES NUANCES DE FILTRES OCULAIRS POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE (selon AWS á 8.2-73)

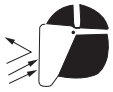
Opération de coupage ou soudage	Dimension d'électrode ou Epiasseur de métal ou Intensité de courant	Nuance de filtre oculaire	Opération de coupage ou soudage	Dimension d'électrode ou Epiasseur de métal ou Intensité de courant	Nuance de filtre oculaire
Brassage tendre au chalumeau	toutes conditions	2	Soudage á l'arc sous gaz avec fil plein (GMAW)		
Brassage fort au chalumeau	toutes conditions	3 ou 4	métaux non-ferreux	toutes conditions	11
Oxycoupage			métaux ferreux	toutes conditions	12
mince	moins de 1 po. (25 mm)	2 ou 3	Soudage á l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
moyen	de 1 á 6 po. (25 á 150 mm)	4 ou 5	Soudage á l'hydrogène atomique (AHW)	toutes conditions	12
épais	plus de 6 po. (150 mm)	5 ou 6	Soudage á l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage aux gaz			Soudage á l'arc Plasma (PAW)	toutes dimensions	12
mince	moins de 1/8 po. (3 mm)	4 ou 5	Gougeage Air-Arc avec électrode de carbone		
moyen	de 1/8 á 1/2 po. (3 á 12 mm)	5 ou 6	mince		12
épais	plus de 1/2 po. (12 mm)	6 ou 8	épais		14
Soudage á l'arc avec électrode enrobees (SMAW)	moins de 5/32 po. (4 mm)	10	Coupage á l'arc Plasma (PAC)		
	5/32 á 1/4 po. (4 á 6.4 mm)	12	mince	moins de 300 amperès	9
	plus de 1/4 po. (6.4 mm)	14	moyen	de 300 á 400 amperès	12
			épais	plus de 400 amperès	14

AVERTISSEMENT

LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

L'arc produit des étincellies et des projections. Les particules volantes, le métal chaud, les projections de soudure et l'équipement surchauffé peuvent causer un incendie et des brûlures. Le contact accidentel de l'électrode ou du fil-électrode avec un objet métallique peut provoquer des étincelles, un échauffement ou un incendie.

1. Protégez-vous, ainsi que les autres, contre les étincelles et du métal chaud.
2. Ne soudez pas dans un endroit où des particules volantes ou des projections peuvent atteindre des matériaux inflammables.
3. Enlevez toutes matières inflammables dans un rayon de 10, 7 mètres autour de l'arc, ou couvrez-les soigneusement avec des bâches approuvées.
4. Méfiez-vous des projections brulantes de soudage susceptibles de pénétrer dans des aires adjacentes par de petites ouvertures ou fissures.
5. Méfiez-vous des incendies et gardez un extincteur à portée de la main.
6. N'oubliez pas qu'une soudure réalisée sur un plafond, un plancher, une cloison ou une paroi peut enflammer l'autre côté.
7. Ne soudez pas un récipient fermé, tel un réservoir ou un baril.
8. Connectez le câble de soudage le plus près possible de la zone de soudage pour empêcher le courant de suivre un long parcours inconnu, et prévenir ainsi les risques d'électrocution et d'incendie.
9. Ne dégelez pas les tuyaux avec un source de courant.
10. Otez l'électrode du porte-électrode ou coupez le fil au tube-contact lorsqu'inutilisé après le soudage.
11. Portez des vêtements protecteurs non huileux, tels des gants en cuir, une chemise épaisse, un pantalon revers, des bottines de sécurité et un casque.



AVERTISSEMENT

LES ETINCELLES ET LES PROJECTIONS BRULANTES PEUVENT CAUSER DES BLESSURES.

Le piquage et le meulage produisent des particules métalliques volantes. En refroidissant, la soudure peut projeter du éclats de laitier.

1. Portez un écran facial ou des lunettes protectrices approuvées. Des écrans latéraux sont recommandés.
2. Portez des vêtements appropriés pour protéger la peau.

AVERTISSEMENT

LES BOUTEILLES ENDOMMAGEES PEUVENT EXPLOSER

Les bouteilles contiennent des gaz protecteurs sous haute pression. Des bouteilles endommagées peuvent exploser. Comme les bouteilles font normalement partie du procédé de soudage, traitez-les avec soin.

1. Protégez les bouteilles de gaz comprimé contre les sources de chaleur intense, les chocs et les arcs de soudage.
2. Enchainez verticalement les bouteilles à un support ou à un cadre fixe pour les empêcher de tomber ou d'être renversées.
3. Eloignez les bouteilles de tout circuit électrique ou de tout soudage.
4. Empêchez tout contact entre une bouteille et une électrode de soudage.
5. N'utilisez que des bouteilles de gaz protecteur, des détendeurs, des boyauxs et des raccords conçus pour chaque application spécifique; ces équipements et les pièces connexes doivent être maintenus en bon état.
6. Ne placez pas le visage face à l'ouverture du robinet de la bouteille lors de son ouverture.
7. Laissez en place le chapeau de bouteille sauf si en utilisation ou lorsque raccordé pour utilisation.
8. Lisez et respectez les consignes relatives aux bouteilles de gaz comprimé et aux équipements connexes, ainsi que la publication P-1 de la CGA, identifiée dans la liste de documents ci-dessous.

AVERTISSEMENT

LES MOTEURS PEUVENT ETRE DANGEREUX

LES GAZ D'ECHAPPEMENT DES MOTEURS PEUVENT ETRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

1. Utilisez l'équipement à l'extérieur dans des aires ouvertes et bien ventilées.
2. Si vous utilisez ces équipements dans un endroit confiné, les fumées d'échappement doivent être envoyées à l'extérieur, loin des prises d'air du bâtiment.

AVERTISSEMENT

LE CARBURANT PEUR CAUSER UN INCENDIE OU UNE EXPLOSION.

Le carburant est hautement inflammable.

1. Arrêtez le moteur avant de vérifier le niveau e carburant ou de faire le plein.

2. Ne faites pas le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
3. Si c'est possible, laissez le moteur refroidir avant de faire le plein de carburant ou d'en vérifier le niveau au début du soudage.
4. Ne faites pas le plein de carburant à ras bord: prévoyez de l'espace pour son expansion.
5. Faites attention de ne pas renverser de carburant. Nettoyez tout carburant renversé avant de faire démarrer le moteur.

AVERTISSEMENT

DES PIECES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.

Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.

1. Assurez-vous que les portes, les panneaux, les capots et les protecteurs soient bien fermés.
2. Avant d'installer ou de connecter un système, arrêtez le moteur.
3. Seules des personnes qualifiées doivent démonter des protecteurs ou des capots pour faire l'entretien ou le dépannage nécessaire.
4. Pour empêcher un démarrage accidentel pendant l'entretien, débranchez le câble d'accumulateur à la borne négative.
5. N'approchez pas les mains ou les cheveux de pièces en mouvement; elles peuvent aussi accrocher des vêtements amples et des outils.
6. Réinstallez les capots ou les protecteurs et fermez les portes après des travaux d'entretien et avant de faire démarrer le moteur.

AVERTISSEMENT

DES ETINCELLES PEUVENT FAIRE EXPLOSER UN ACCUMULATEUR; L'ELECTROLYTE D'UN ACCUMU-LATEUR PEUT BRULER LA PEAU ET LES YEUX.

Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.

1. Portez toujours un écran facial en travaillant sur un accumu-lateur.
2. Arrêtez le moteur avant de connecter ou de déconnecter des câbles d'accumulateur.
3. N'utilisez que des outils anti-étincelles pour travailler sur un accumulateur.
4. N'utilisez pas une source de courant de soudage pour charger un accumulateur ou survolter momentanément un véhicule.
5. Utilisez la polarité correcte (+ et –) de l'accumulateur.

AVERTISSEMENT

LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRULANT SOUS PRESSION PEUVENT BRULER LA PEAU ET LES YEUX.

Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.

1. N'ôtez pas le bouchon de radiateur tant que le moteur n'est pas refroidi.
2. Mettez des gants et posez un torchon sur le bouchon pour l'ôter.
3. Laissez la pression s'échapper avant d'ôter complètement le bouchon.

PLOMB AVERTISSEMENT

Ce produit contient des produits chimiques, comme le plomb, ou engendre des produits chimiques, reconnus par l'état de Californie comme pouvant être à l'origine de cancer, de malformations fœtales ou d'autres problèmes de reproduction. ***Il faut se laver les mains après toute manipulation.*** *(Code de Californie de la sécurité et santé, paragraphe 25249.5 et suivants)*

1.06 Principales Normes De Securite

Safety in Welding and Cutting, norme ANSI Z49.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

Safety and Health Standards, OSHA 29 CFR 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

National Electrical Code, norme 70 NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, document P-1, Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, norme CSA W117.2 Association canadienne de normalisation, Standards Sales, 276 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, norme ANSI Z87.1, American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme 51B NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.07 Graphique de Symbole

Seulement certains de ces symboles apparaîtront sur votre modèle.

	Sous Tension
	Hors Tension
	Tension dangereuse
	Augmentez/Diminuer
	Disjoncteur
	Source AC Auxiliaire
	Fusible
A	Intensité de Courant
V	Tension
Hz	Hertz (cycles/sec)
f	Fréquence
—	Négatif
+	Positif
=	Courant Continue (DC)
	Terre de Protection
	Ligne
	Connexion de la Ligne
	Source Auxiliaire
115V 15A	Classement de Prise-Source Auxiliaire

1 ~	Mono Phasé
3 ~	Trois Phasé
	Tri-Phase Statique Fréquence Convertisseur Transformateur-Redresseur
	Distant
X	Facteur de Marche
%	Pourcentage
	Panneau/Local
	Soudage Arc Electrique Avec Electrode Enrobé (SMAW)
	Soudage á L'arc Avec Fil Electrodes Fusible (GMAW)
	Soudage á L'arc Avec Electrode Non Fusible (GTAW)
	Decoupe Arc Carbone (CAC-A)
	Courant Constant
	Tension Constante Ou Potentiel Constant
	Haute Température
	Force d'Arc
	Amorçage de L'arc au Contact (GTAW)
	Inductance Variable
V	Tension

	Déroulement du Fil
	Alimentation du Fil Vers la Pièce de Fabrication Hors Tension
	Torch de Soudage
	Purge Du Gaz
	Mode Continu de Soudure
	Soudure Par Point
t	Duréc du Pulse
t1	Durée de Pré-Dèbit
t2	Durée de Post-Dèbit
	Détente à 2-Temps Appuyez pour dèruarer l'alimentation du fils et la soudure, le relâcher pour arrêter.
	Détente à 4-Temps Maintenez appuyez pour pré-dèbit, relailez pour initier l'arc. Appuyez pour arrêter l'arc, et mainteuir pour pré-dèbit.
t	Probléme de Terre
IPM	Pouces Par Minute
MPM	Mètres Par Minute
	Art # A-07639

SECTION 2: INTRODUCTION

2.01 How to Use This Manual

This Operating Manual usually applies to the part numbers listed on page i. If none are underlined, they are all covered by this manual. To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings. Throughout this manual, the word WARNING, CAUTION and NOTE may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:

WARNING

Gives information regarding possible personal injury. Warnings will be enclosed in a box such as this.

CAUTION

Refers to possible equipment damage. Cautions will be shown in bold type.

NOTE

Offers helpful information concerning certain operating procedures. Notes will be shown in italics

Additional copies of this manual may be purchased by contacting Thermal Arc at the address and phone number in your area listed in the inside back cover of this manual. Include the Owner's Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the Thermal Arc web site listed below and clicking on the Literature Library link:

http://www.thermalarc.com

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the machine. Equipment which does not have a nameplate attached to the machine is identified only by the specification or part number printed on the shipping container. Record these numbers for future reference.

2.03 Receipt of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual. Include all equipment identification numbers as described above along with a full description of the parts in error.

2.04 General

The FirePower FP-125, 135, 165 Machines are single-phase input welding machines and come equipped with the following:

1. Built-in Wire Feeder and Wire Spool Hub
2. Welding Gun and Cable
3. Work Cable and Clamp
4. Regulartor/Flow Meter (FP-125 optional)
5. Input Cord
6. 2 Spare Contact Tips
7. Operational Manual
8. 0.5 lb. Spool of Wire
9. Gas Hose

The welding system is designed for use with the following processes:

1. GMAW - Gas metal arc welding (MIG). Requires the use of a shielding gas and regulator.
2. FCAW – Flux-cored arc welding – Does not require the use of a shielding gas.

2.05 Specifications

Description	FP-125	FP-135	FP-165
Package System Part Number	1444-0324	1444-0326	1444-0328
Power Source Weight	47.4 lb (21.5 kg)	52.9 lb (24.0kg)	58.1 lb (26.4 kg)
Power Source Dimensions HxWxD	12 x 9.75 x 17.5" (304.8 x 247.7 x 444.5mm)		
Number of Phases	1 Ø		
Frequency	60Hz		
Flexible Supply Cable Size	7 ft (2.2 m) 14AWG	7 ft (2.2 m) 14AWG	7.5 ft (2.5 m) 14AWG
Supply Lead Plug Type	5-15P	5-15P	6-50P
Nominal Input Voltage	120V AC	120V AC	230V AC
Rated kVA @ 100% Duty Cycle	5kVA	6kVA	7kVA
Rated Input Current	15A (60A@40%)	15A (60A@60%)	22.5A (120A@25%)
Maximum Input Current	38A (110A@10%)	50A (120A@13%)	35A (155A@15%)
Generator Requirements	# 5kVA	# 6kVA	# 7kVA
Supply VA @ max. output	# 4.6kVA	# 5kVA	# 6.8kVA
Open Circuit Voltage Range	16 – 30V	16 – 32V	15 – 30V
Output Current Range	40 – 125A	39 – 135A	36 – 165A
Duty Cycle Period	10 Minutes		
Number of Output Voltage Values	4		
Minimum Mains Circuit to suit factory fitted Plug & Lead (Weld Current @ Duty Cycle)	15A (60A@40%)	15A (60A@60%)	22.5A (120A@25%)
Maximum Mains Circuit to suit factory fitted Plug & Lead (Weld Current @ Duty Cycle)	38A (110A@10%)	50A (120A@13%)	35A (155A@15%)
Wire Size Range			
Steel	.023” - .030” - .035" (0.6 - 0.8 - 0.9mm)		
Stainless Steel		.023” - .030” - .035" (0.6 - 0.8 - 0.9mm)	.023” - .030” - .035" (0.6 - 0.8 - 0.9mm)
Flux Core	.030” - .035” (0.8 - 0.9mm)	.030” - .035” (0.8 - 0.9mm)	.030” - .035” (0.8 - 0.9mm)

Table 2-1: System Specifications

Δ The recommended time delay fuse or circuit breaker size is 20 amp. An individual branch circuit capable of carrying 30 amperes and protected by fuses or circuit breaker is recommended for this application. Fuse size is based on not more than 200 percent of the rated input amperage of the welding power source (Based on Article 630, National Electrical Code)

Thermal Arc continuously strives to produce the best product possible and therefore reserves the right to change, improve or revise the specifications or design of this or any product without prior notice. Such updates or changes do not entitle the buyer of equipment previously sold or shipped to the corresponding changes, updates, improvements or replacement of such items.

The values specified in the table above are optimal values, your values may differ. Individual equipment may differ from the above specifications due to in part, but not exclusively, to any one or more of the following; variations or changes in manufactured components, installation location and conditions and local power grid supply conditions.

2.06 Volt - Amp Curves

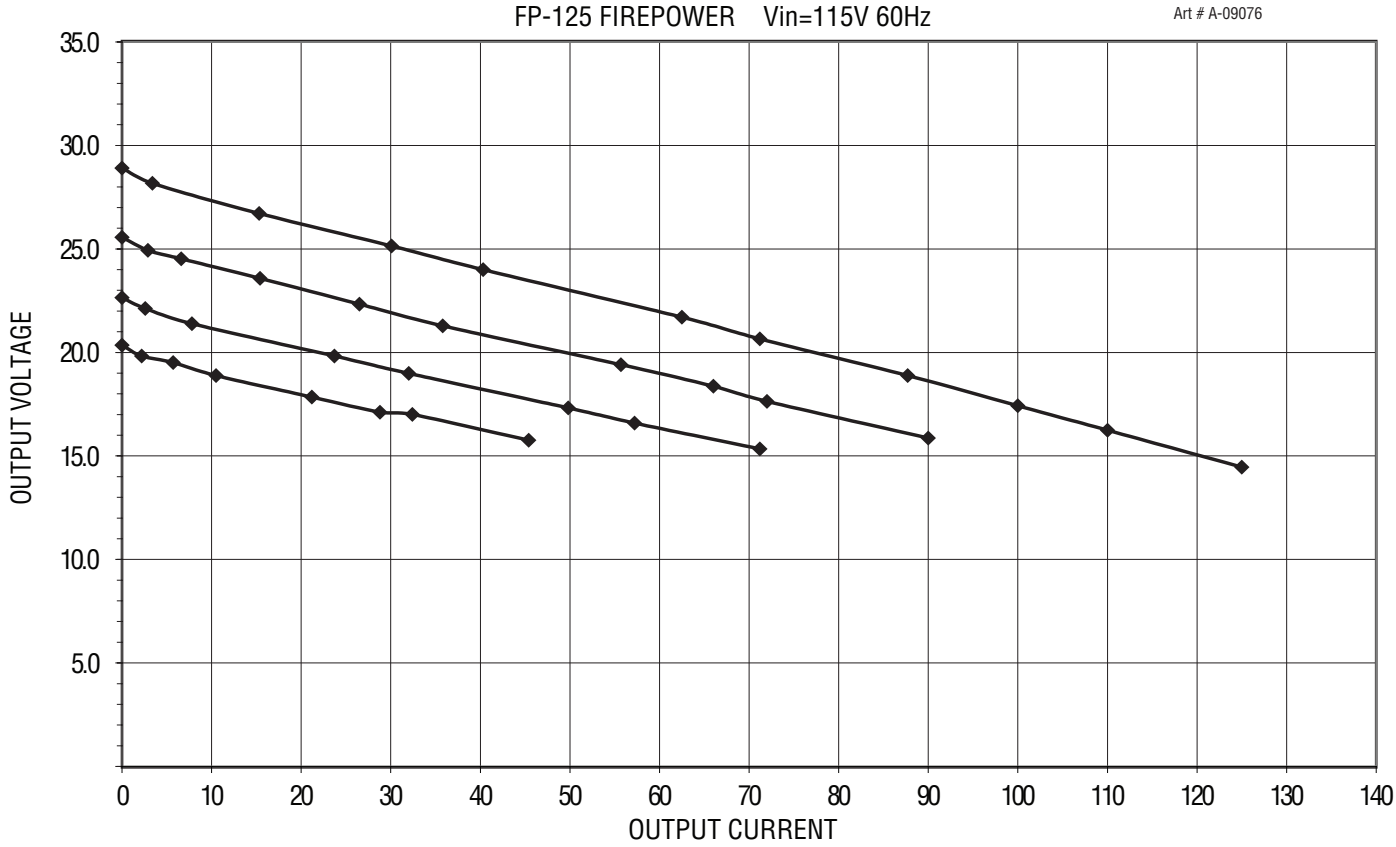


Figure 2-1: Volt/Amp curves of the FirePower 125

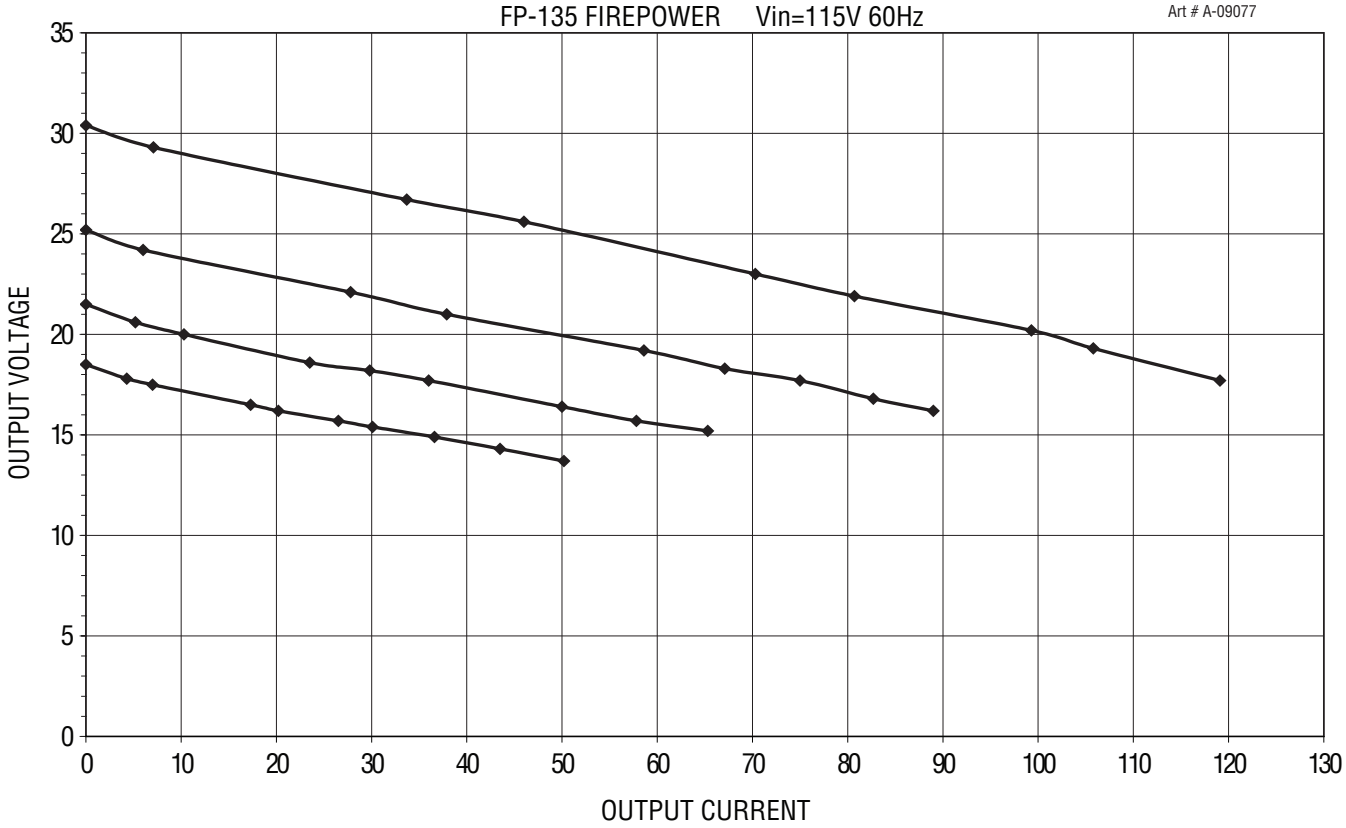


Figure 2-1: Volt/Amp curves of the FirePower 135

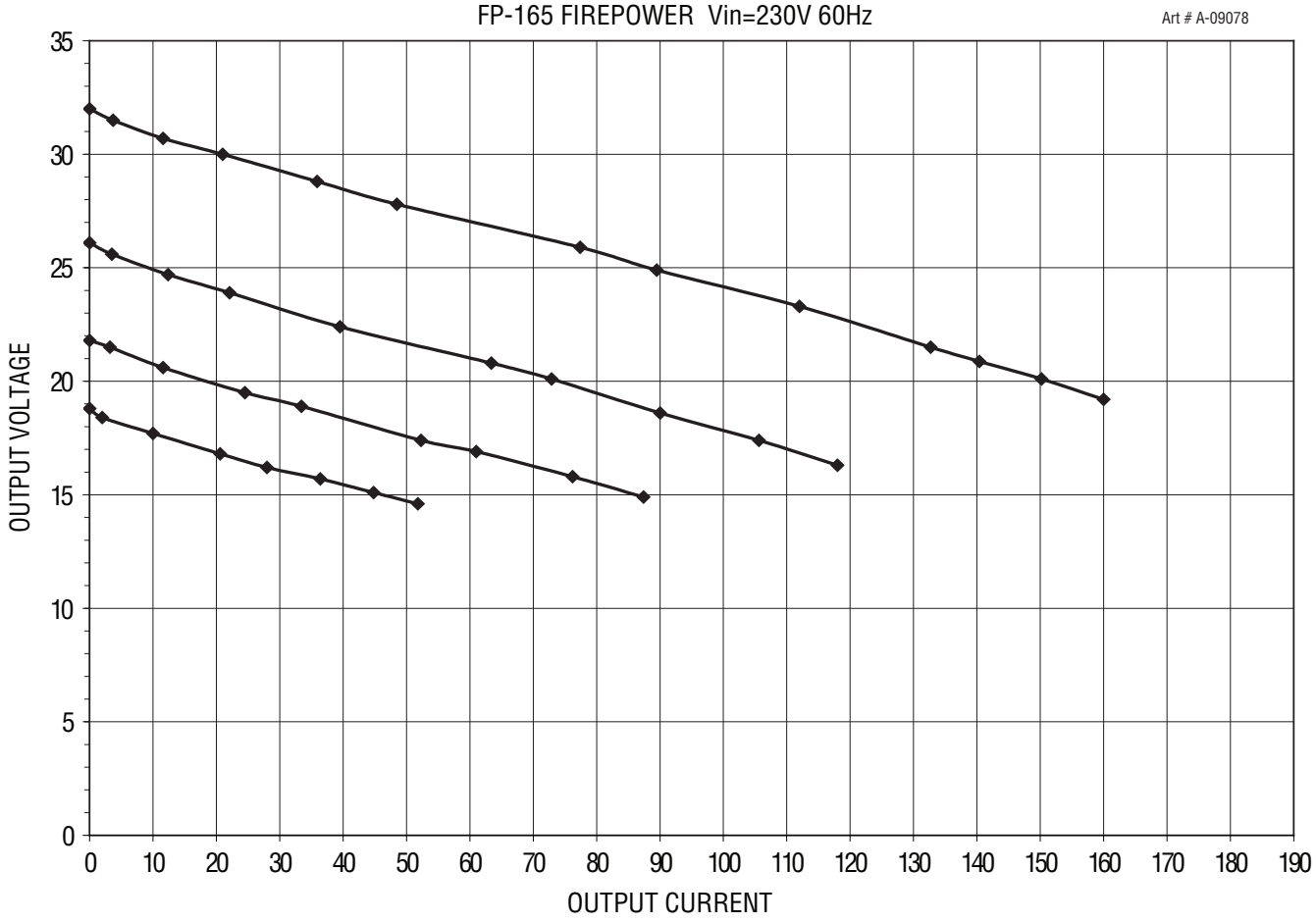


Figure 2-1: Volt/Amp curves of the FirePower 165

2.07 Duty Cycle

Duty Cycle is the amount of arc-on time (actual welding time) during any 10 minute period that a machine can operate at it's rated output without damaging internal components. For example, the FirePower FP-135 is designed for 20% duty cycle at 117 amps. This means that it has been designed and built to provide the rated amperage, 117 amps, for 2 minutes out of every 10 minute period. During the other 8 minutes of the 10 minute period, the FirePower FP-135 must idle and be allowed to cool. The thermal cutout will operate if the duty cycle is exceeded.

The FirePower FP-125 is designed for 19% duty cycle at 90 Amps.

The FirePower FP-135 is designed for 20% duty cycle at 117 Amps.

The FirePower FP-165 is designed for 18% duty cycle at 140 Amps.

If the unit overheats and the thermostat opens, wait 15 minutes for unit to cool.

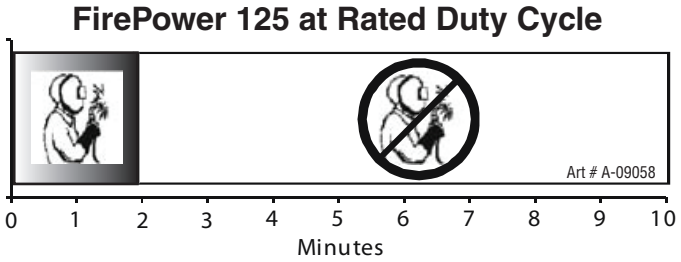


Figure 2-5: Duty Cycle of FirePower125

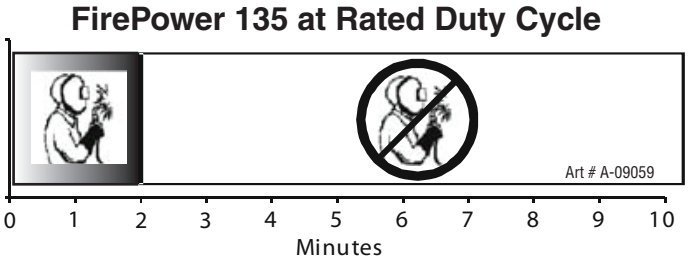


Figure 2-6: Duty Cycle of FirePower135

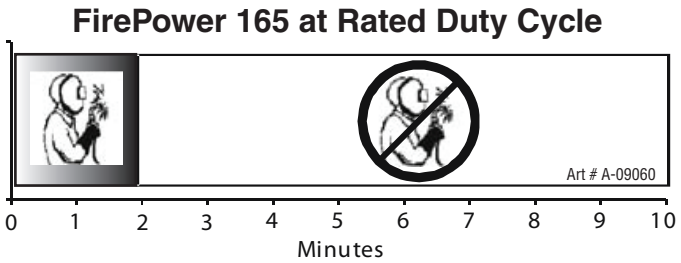
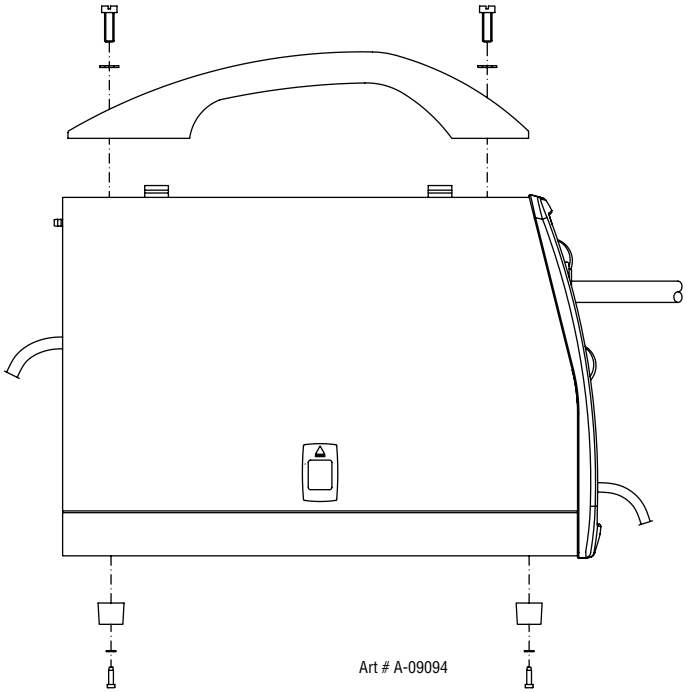


Figure 2-7: Duty Cycle of FirePower165

2.08 MIG Gun Maintenance

Remove dust and metallic particles from the gun conduit by forcing clean, dry compressed air into the conduit once a week. This will minimize wire feeding problems.

2.09 Handle / Feet Assembly



Art # A-09094

SECTION 3: INSTALLATION

3.01 Location

For best operating characteristics and longest unit life, take care in selecting the installation site. Avoid locations exposed to high humidity, dust, high ambient temperature, or corrosive fumes. Moisture can condense on electrical components, causing corrosion or shorting of circuits. Dirt on components will retain this moisture and also increases wear on moving parts.

Adequate air circulation is needed at all times in order to assure proper operation. Provide a minimum of 12" (300mm) of free air space at both the front and rear of the unit. Make sure that the ventilation openings are not obstructed.

CAUTION

The FirePower is not suitable for use in rain.

3.02 Safety

Refer to additional installation instructions under the SAFETY INSTRUCTIONS AND WARNINGS (Section 1) in this manual.

3.03 Grounding

The internal frame of this welding machine should be grounded for personal safety. Where grounding is mandatory under state or local codes, it is the responsibility of the user to comply with all applicable rules and regulations. Where no state or local codes exist, it is recommended that the National Electrical Code be followed.

3.04 Electrical Input Requirements

Plug the input cord into a properly grounded and protected (by fuse or circuit breaker) mains receptacle capable of handling a minimum of 20 Amperes. Firepower FP-125 & FP-135 requires a 120VAC supply voltage and the Firepower FP-165 requires a 230VAC supply voltage.

The Firepower FP-125 & FP-135's power cord is equipped with a NEMA 5-15P plug and will only connect to a NEMA 5-15P receptacle.

Except for some early models, the Firepower FP-165's power cord is equipped with a NEMA 6-50P plug and will only connect to a NEMA 6-50P receptacle.

CAUTION

Consult the nameplate for proper input voltage and input amperage. The method of installation, conductor size, and over-current protection shall conform to the requirements of the local electrical code. All installation wiring and machine connection shall be done by a competent electrician.

The National Electrical Code (Article 630B) provides standards for amperage handling capability of supply conductors based on the duty cycle of the welding power source. The FirePower FP-125 has a 19% duty cycle (1 minute 54 seconds of every 10 minutes can be used for welding). The FirePower FP-135 has a 20% duty cycle (2 minutes of every 10 minutes can be used for welding). The FirePower FP-165 has an 18% duty cycle (1 minute 48 seconds of every 10 minutes can be used for welding). The power cords supplied with these units comply with these standards. Ensure that the building supply and receptacle comply with NEC standards and any additional state and local codes.

NOTE

The supply wiring for the welding power source must be capable of handling a minimum of 20 amperes. The welding power source must be the only load connected to the supply circuit. Poor unit performance or frequently opening line fuses or circuit breakers can result from an inadequate or improper supply.

CAUTION

Do not connect the FirePower FP-125 or 135 to an input power supply with a rated voltage that is greater than 120 +10% VAC. Do not remove the power cord ground prong.

CAUTION

Do not connect the FirePower FP-165 to an input power supply with a rated voltage that is greater than 230 + 10% VAC. Do not remove the power cord ground prong.

3.05 Requirements for Maximum Output

In order to obtain the maximum output capability of the FirePower FP-125 a branch circuit capable of 40 amperes at 115 to 125 Volts 60 Hz is required. In order to obtain the maximum output capability of the FirePower FP-135 a branch circuit capable of 50 amperes at 115 to 125 Volts 60 Hz is required. In order to obtain the maximum output capability of the FirePower FP-165 a branch circuit capable of 30 amperes at 208 to 230 Volts 60 Hz is required. This generally applies when welding steel that is equal to or greater than 12 gauge (0.105" 2.5mm) in thickness.

3.06 Installation of Shielding Gas (GMAW) Process

Refer to Figure 3-1.

NOTE

Shielding Gas is not required if the unit is using self-shielded FCAW (flux cored arc welding) wires.

1. Cylinder Positioning: Chain the cylinder to a wall or other support to prevent the cylinder from falling over. If an optional portable mounting arrangement is used, follow the instructions that are provided with it.
2. Remove Cylinder Cap: Remove the large metal cap on top of the cylinder by rotating counter clockwise. Next remove the dust seal.
3. Cracking: Position yourself so the valve is pointed away from you and quickly open and close the valve for a burst of gas. This is called "Cracking" and is done to blow out any foreign matter that may be lodged in the fitting.

CAUTION

KEEP FACE WELL AWAY FROM THE CYLINDER VALVE DURING "CRACKING". Never "crack" a fuel gas cylinder valve near other welding works, sparks or open flames. Ensure that the surrounding area is well ventilated.

4. Fit Regulator/Flowmeter to Cylinders:

Screw the regulator into the appropriate cylinder. The nuts on the regulator and hose connections are right hand (RH) threaded and need to be turned in a clockwise direction in order to tighten. Tighten with a wrench.

CAUTION

Match regulator to cylinder. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.

5. Attach Supplied Gas Line: Attach supplied gas line between the regulator output and the desired input at the rear of the power supply depending on Spool Gun or MIG Gun use.

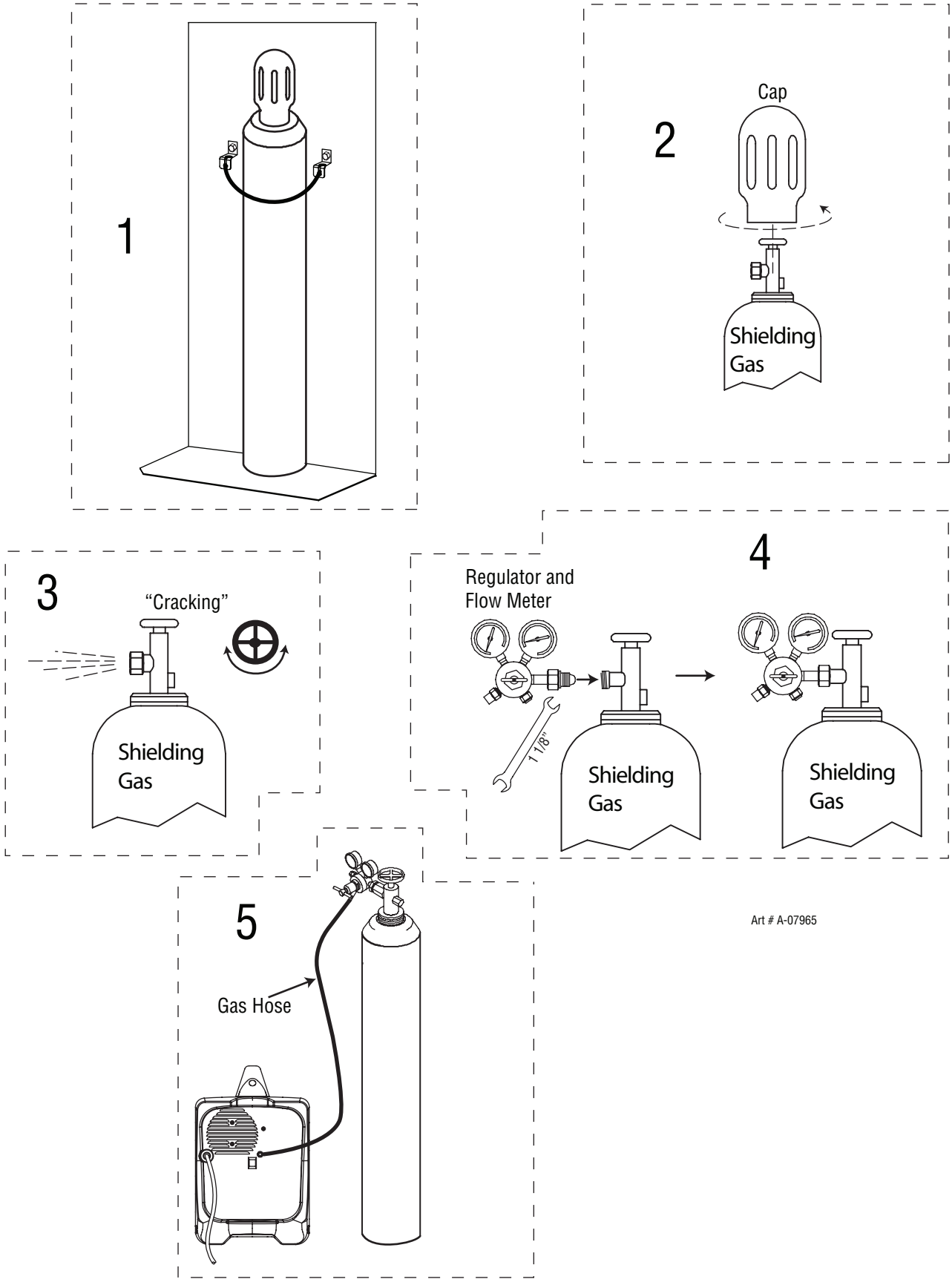


Figure 3-1 Gas Cylinder Installation for Reference Only!

Adjusting Regulator

Adjust control knob of regulator to the required flow rate, indicated on gauge dial. (Refer to Figure 3-2 and data charts. Approx. 20 CFH)

The gas flow rate should be adequate to cover the weld zone to stop weld porosity. Excessive gas flow rates may cause turbulence and weld porosity.

Argon or argon based gas flow rates:

- Workshop welding: 20-30 CFH
- Outdoors welding: 30-40 CFH

Helium based or CO2 gas flow rates:

- Workshop welding: 30-40 CFH
- Outdoors welding: 40-50 CFH

NOTE

All valves downstream of the regulator must be opened to obtain a true flow rate reading on the outlet gauge. (Welding power source must be triggered) Close the valves after the pressure has been set.

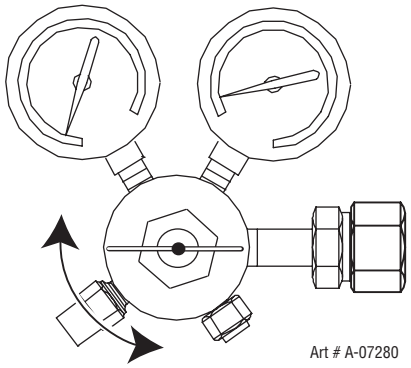


Figure 3-2: Adjusting flow rate. Illustration for Reference Only.

Refer to section 4.15 for suggested gas / filler metal combinations.

NOTE

The regulator/flowmeters used with argon-based and carbon dioxide shielding gases are different. The regulator/flow meter supplied is for argon based shielding gases. If carbon dioxide is to be used a suitable carbon dioxide regulator/flow meter will need to be fitted.

Two types of gas are generally used with Gas Metal Arc Welding (GMAW) of thin gauge sheet steel. A mixture of 75% Argon and 25% Carbon Dioxide (CO2) is recommended, Carbon Dioxide (CO2) can also be used.

3.07 Attaching the Gun and Cable Assembly to the Power Source

The Firepower FP-125, FP-135, FP-165 are supplied with a 80A MIG gun. The 80A MIG gun is designed with an ergonomic handle and fewer parts to eliminate performance problems. The 80A MIG gun uses standard readily available TWECO consumable parts.

1. Open the door to the machine.
2. Connect the gun cable to the power source by first routing the switch lead through the access hole in the front panel followed by the gun cable (see Figure 3-3).

NOTE:

Turn the cable end to align the gas hose nipple on the connector plug with the keyway located in the bottom of the front panel access hole.

3. Loosen the screws and insert the gun cable end as far as it will go. Tighten thumbscrew (see Figure 3-3).
4. Insert the gun switch plug into the gun switch socket (see Figure 3-3).
5. If shielding gas is being used, push the gas hose on to the gas hose nipple and secure it with the hose clamp.
6. To remove the gun, simply reverse these directions.

CAUTION

When disconnecting gun switch leads from the machine, grab the connectors and pull. Do not pull on the wires.

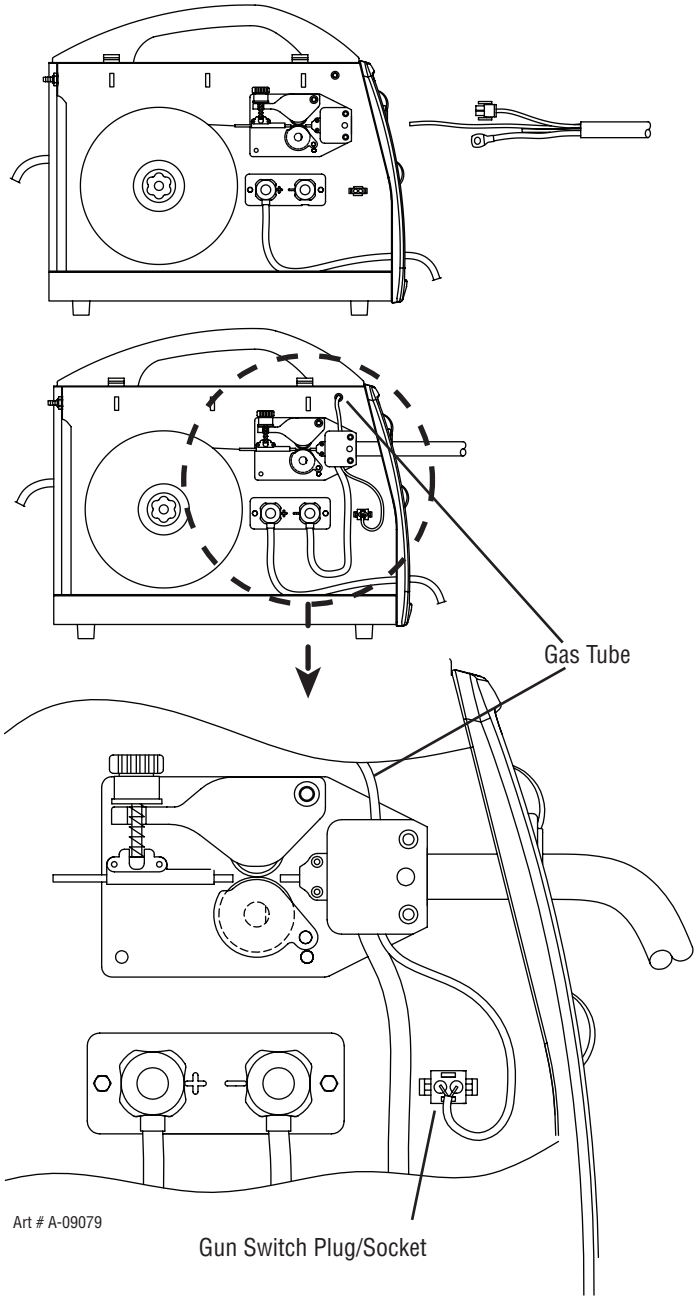


Figure 3-3: Attaching Gun and Cable

3.08 Polarity Changeover

WARNING

ELECTRIC SHOCK CAN KILL! Make certain the machine is unplugged from the power receptacle. Do not plug machine in until told to do so in these instructions

As delivered from the factory, the output polarity is set to the polarity which matches the welding wire supplied with the unit. The output terminals are located on the interior panel of the welding power source if you need to change polarity.

PROCESS	POLARITY	CABLE CONNECTIONS	
		CABLE TO GUN	CABLE TO WORK
1. GMAW – Solid Wire	1. DCEP – Reverse Polarity	1. Connected to (+) Pos. output terminal	1. Connected to (-) Neg. output terminal
2. FCAW – Self-shielding Wire – no Shielding Gas	2. DCEN – Straight Polarity	2. Connected to (-) Neg. output terminal	2. Connected to (+) Pos. output terminal

Table 3-1: Process Cable Connections

Connection for GMAW (reverse polarity DCEP)

1. Open the door to the machine.
2. Remove the polarity terminal knobs.
3. Set up the polarity (as per Table 3-1 above) by removing the leads from the terminals and reversing them if necessary. Refer to Figure 3-4.
4. Replace the polarity terminal knobs.

NOTE

Ensure that the polarity terminal knobs are tightly secured and that there is no connection between positive and negative terminals.

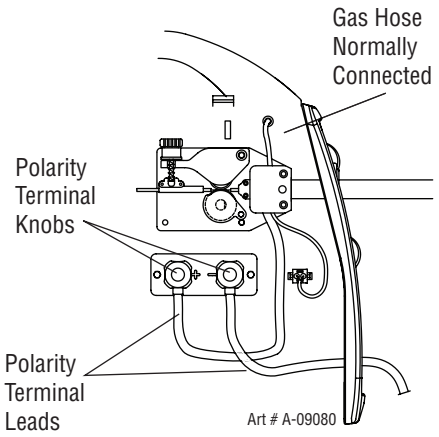


Figure 3-4: Connection for GMAW (reverse polarity DCEP)

Connection for FCAW (straight polarity DCEN)

1. Open the door to the machine.
2. Remove the polarity terminal knobs.
3. Set up the polarity (as per Table 3-1 above) by removing the leads from the terminals and reversing them if necessary. Refer to Figure 3-5.
4. Replace the polarity terminal knobs.

NOTE

Ensure that polarity terminal knobs are tightly secured and that there is no connection between positive and negative terminals.

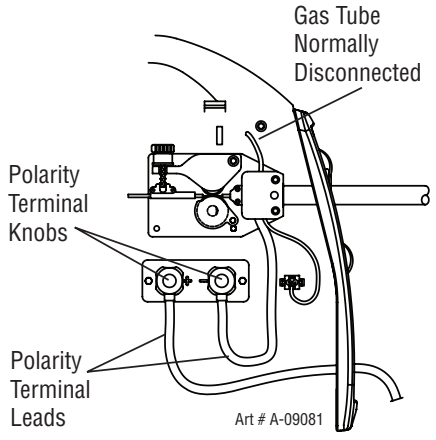


Figure 3-5: Connection for FCAW (straight polarity DCEN)

3.09 Installing Wire Spool

As delivered from the factory, the unit is set for an 4” (102mm) spool.

Installation of Wire Spool

Assemble parts in sequence (shown in Figure 3-6 from right to left).

1. Spool 4” (102mm)
2. External Ring
3. Retaining Spring
4. Nut

NOTE

Nut is tightened until a slight force is required to turn the spool

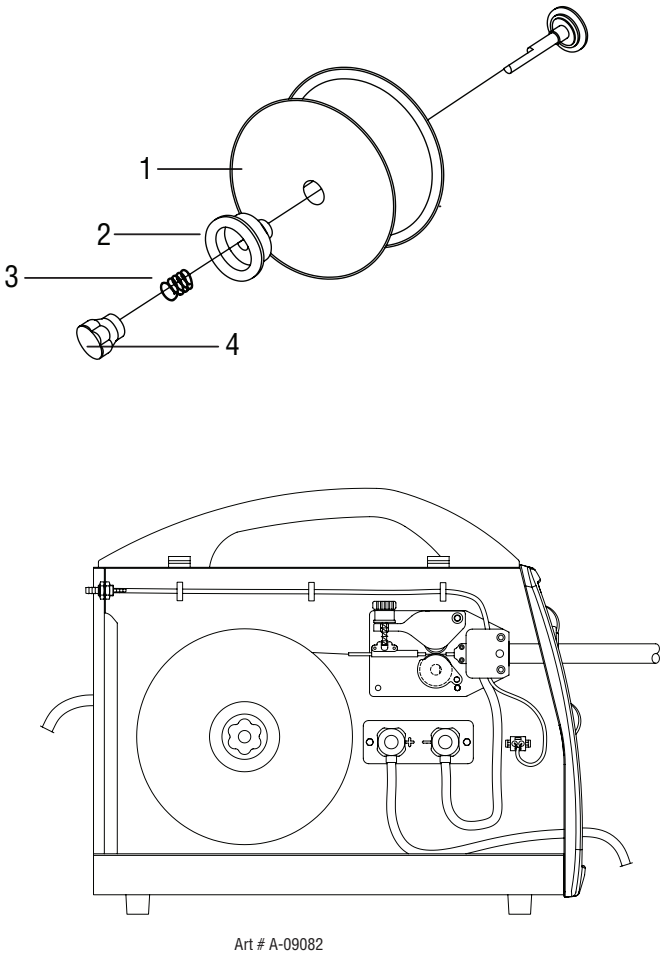


Figure 3-6: 4" Spool Installation

3.10 Feedrolls

A feedroll consists of two different sized grooves, .023” (0.6mm) and .030” / .035” (0.8mm / 0.9mm).

The branding inside at the end of the feedroll refers to the size nearest to the mark

This also applies to optional feedrolls which are available for this machine.

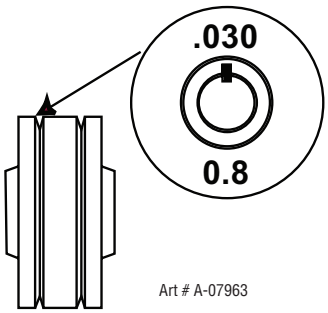


Figure 3-7 : Feedroll Example

3.11 Install Wire into the Feedhead

WARNING

ELECTRIC SHOCK CAN KILL! Make certain the machine is unplugged from the power receptacle. Do not plug machine in until told to do so in these instructions.

1. Loosen the nut of the spool holder (brake drum). Remove the spring and the external ring.
2. Remove the plastic protection from the spool. Place it on the spool holder again. Mount the external ring , the spring and the plastic lock nut again. These parts form the braking system for the wire spool. Tighten nut to appropriate tightness. Excessive pressure strains the wire feeding motor. Too little pressure does not allow the immediate stop of the wire spool at the end of the welding.

CAUTION

Use care in handling the spooled wire as it will tend to "unravel" when loosened from the spool. Grasp the end of the wire firmly and do not let go of it. Make sure that the end of the wire is free of any burrs and is straight.

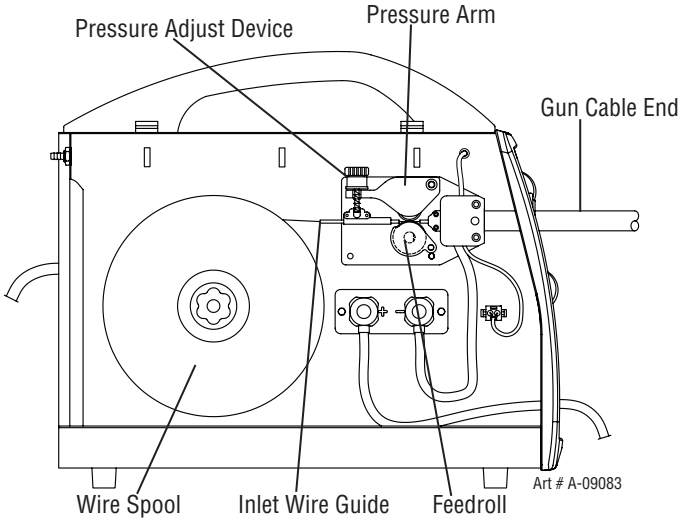


Figure 3-8: Wire Feeder Components

Route the Wire Through the Feedhead

1. Loosen Pressure Adjust Device (Fig. 3-9).
2. Open Pressure Adjust Device (Fig. 3-9).
3. Open Pressure Arm (Fig. 3-9).
4. Place the end of the wire into the Inlet Wire Guide, feeding it over the Feedroll. Make certain that the proper groove is being used (Fig. 3-10).
5. Pass the wire into the Gun Liner of the Gun Cable End (Fig. 3-10).
6. Close the Pressure Arm (Fig. 3-10).
7. Close the Pressure Adjust Device. Tighten it to a "snug" condition (Fig. 3-10).
8. Figure 3-11 shows the result with the wire installed.

NOTE

If there is too much pressure on the drive roll the wire gets locked and the motor could get damaged, If it is too loose the wire will not feed properly.

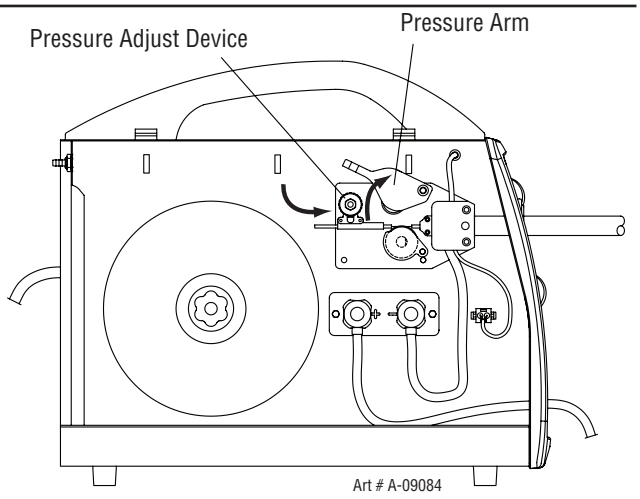


Figure 3-9: Opening Pressure Arm

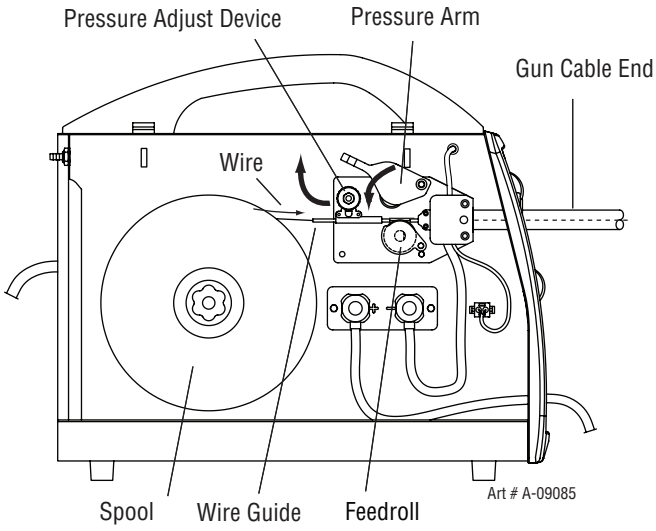


Figure 3-10: Inserting Wire

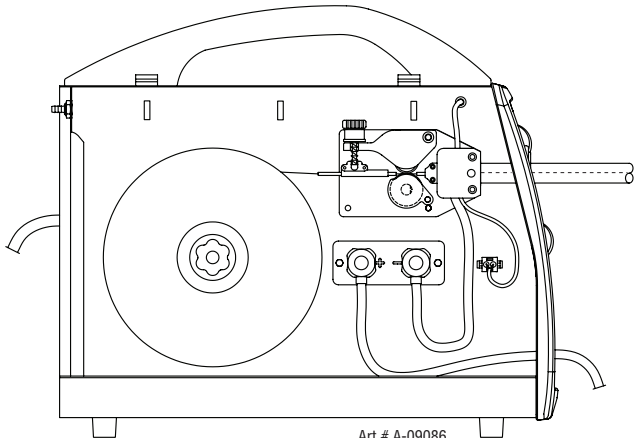


Figure 3-11: Wire Installed

3.12 Install Wire into the Welding Gun

1. Plug the Welding Power Source into the 120VAC receptacle for the FirePower FP-125 and FP-135, and into the 230VAC receptacle for the FirePower FP-165.

WARNING

ELECTRIC SHOCK CAN KILL! With the gun switch (located on the gun) activated, welding power is applied to the output terminals, feedroll, ground clamp, gun cable connection and welding wire. Do not touch these parts with the gun switch activated.

2. Turn the welding machine ON with the front panel Voltage Control Switch set to "1".

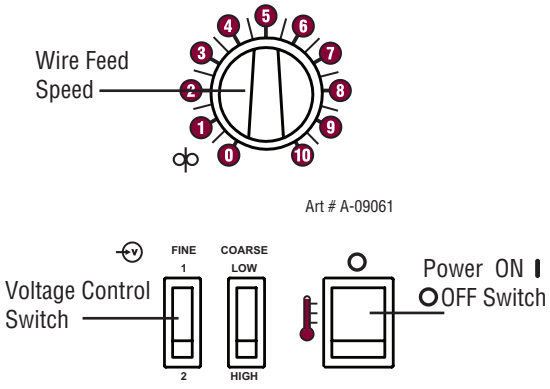


Figure 3--12: FP-125 Power ON

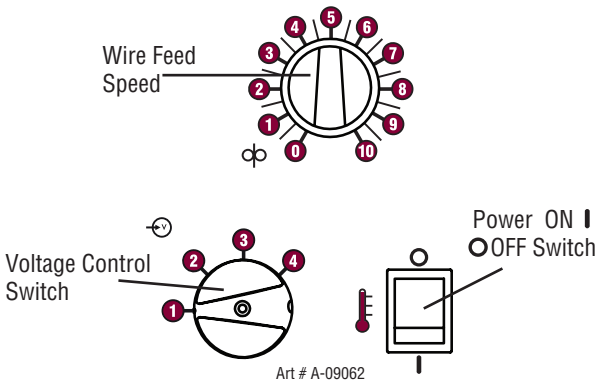


Figure 3--13: FP-135, 165 Power ON

3. Set the wire feed speed to half-way or "5".

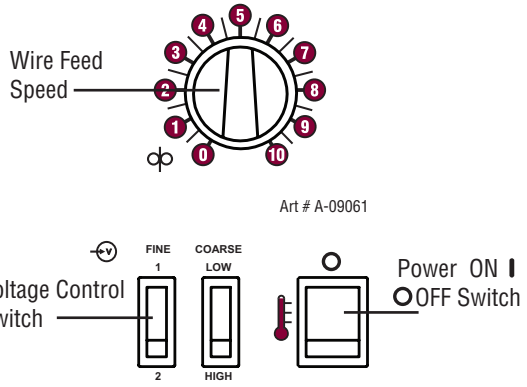


Figure 3-14: FP-125 Wire Speed Half-way

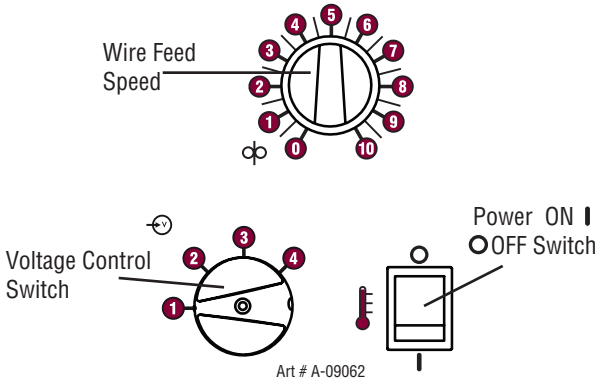


Figure 3-15: FP-135, 165 Wire Speed Half-way

4. Straighten the gun cable. Remove the nozzle and contact tip from the MIG welding gun (see Section 2.08).

WARNING

If ground connection clamp is in place on the workpiece the electrode wire is electrically "hot" when the gun switch is activated.

5. Activate the gun switch until the wire feeds out past the gun nozzle.

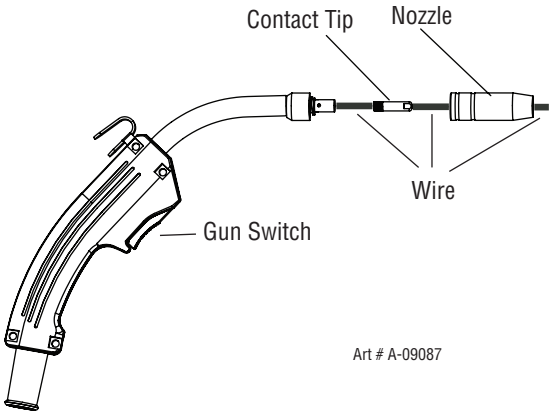


Figure 3-15: Feed Wire Through Gun

6. Deactivate the gun switch and set the Power Control Switch to "0 / OFF" and unplug the supply cord.
7. Replace the contact tip and nozzle. Cut the wire within ¼" (6mm) from the nozzle.

SECTION 4:
OPERATION

4.01 General Safety Precautions

Read and understand the safety instructions at the beginning of this manual prior to operating this machine.

WARNING

Be sure to put on proper protective clothing and eye safeguards (welding coat, apron, gloves, and welding helmet, with proper lenses installed). See Safety Instructions and Warnings chapter included in this manual. Neglect of these precautions may result in personal injury.

WARNING

Make all connections to the power source including electrode and work cables, as well as remote control cables, with the power source turned off. These connections could be electrically live with the power switch ON.

WARNING

ELECTRIC SHOCK CAN KILL! Do not operate the machine with the door open.

CAUTION

Do not pull the machine with the gun. Damage can occur to the gun, gun liner and machine. Avoid bending the gun cable with a sharp radius. Damage can occur to the gun liner.

4.02 FirePower Controls

Refer to Figure 4-1 and 4-2.

1. Power ON / OFF switch turns the power on and off. It also lights when the power supply has gone into overtemp.
2. The Wire Speed Control knob controls the welding current via the electrode wire feed rate (i.e. the speed of the wire feed motor).
3. The Voltage Control Switch(s) sets the voltage level to the welding terminals. There are 4 positions available.

CAUTION

The Voltage Control Switch MUST NOT BE SWITCHED during the welding process. Some internal electrical components are at Mains voltage potential with this switch in the OFF position.

4. MIG Gun cable end and Gun Switch Leads are routed through this opening.
5. The Work Cable & Clamp connects to the item being welded.
6. The gas inlet nipple is used to connect the gas hose to the gas regulator for GMAW. Use the hose clamp to secure the hose to the gas nipple.
7. Main Power Cable.
8. The moveable tension knob applies pressure to the grooved roller via screw-adjustable spring pressure. The adjustable spring screw should be adjusted to a minimum pressure that will provide satisfactory wire feed without slippage. If slipping occurs, and inspection of the wire contact tip reveals no wear, distortion or burn-back jam, the conduit liner should be checked for kinks and clogging by metal flakes and slag. If this is not the cause of slipping, the feedroll pressure can be increased by rotating the adjustable spring screw clockwise. The use of excessive pressure may cause rapid wear of the feed roller, motor shaft and motor bearings.

NOTE

Genuine TWECO contact tips should be used.

9 The Gun Adaptor connects the MIG Gun to the feedhead assembly.

10 The Gun Switch Connector is provided for connection of the Gun Switch Leads.

11. Negative (-) Welding Terminal.
12. Positive (+) Welding Terminal.

CAUTION

Loose welding terminal connections can cause overheating and result in the cables being fused to the welding terminals.

13. The wire reel hub incorporates a friction brake which is adjusted during manufacture for optimum braking. If it is considered necessary, adjustment can be made by turning the large nut inside the open end of the wire reel hub. Clockwise rotation will tighten the brake. Correct adjustment will result in the wire reel circumference continuing no further than ¾" (20mm) after release of the Torch Trigger Switch. The wire should be slack without becoming dislodged from the reel.

CAUTION

Excessive tension on the brake will cause rapid wear of mechanical wire feed parts, overheating of electrical components and possibly an increased incidence of wire burnback into the contact tip.

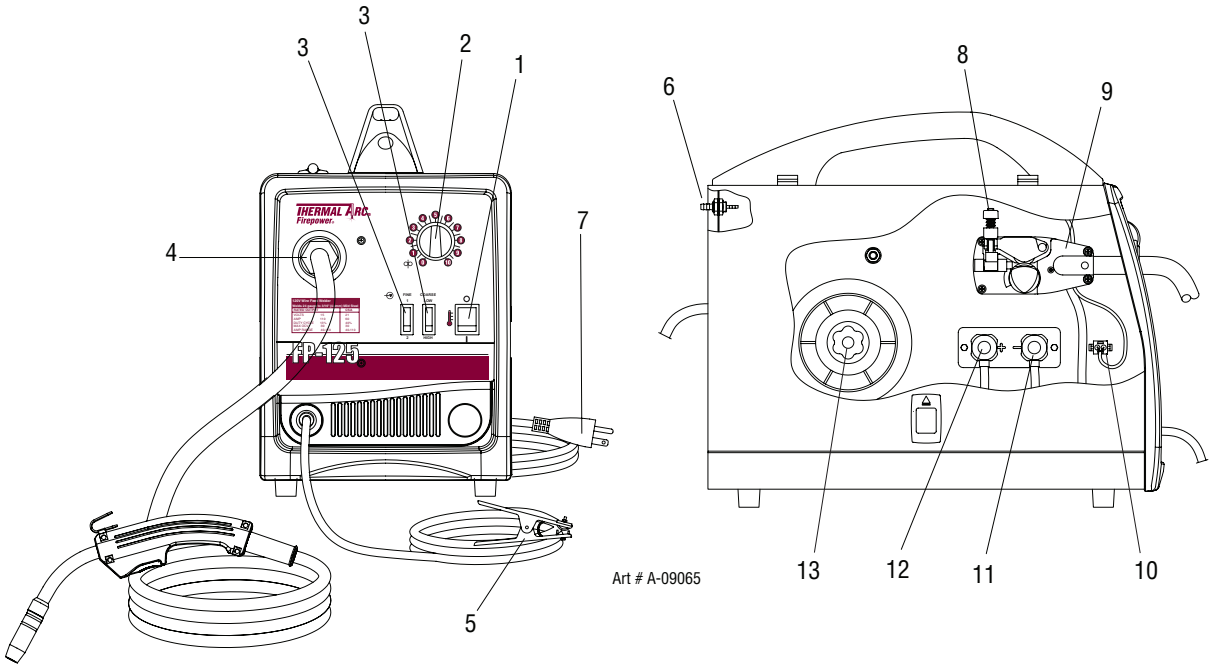


Figure 4-1: FirePower FP-125 Controls

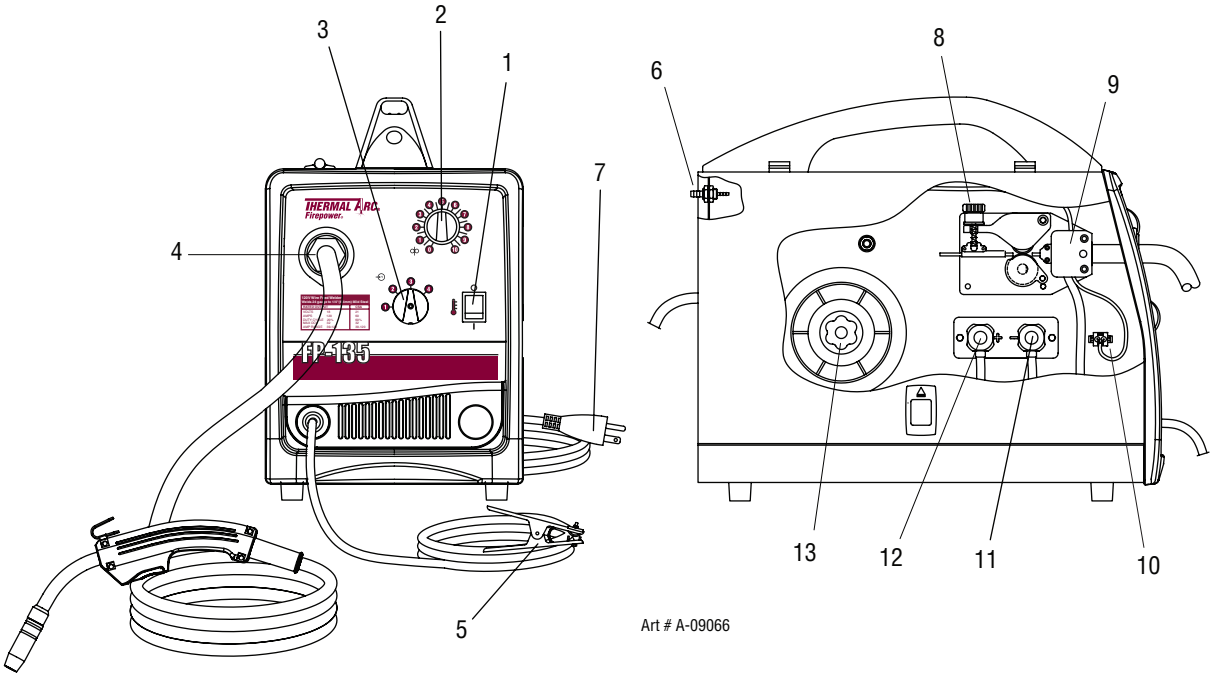


Figure 4-2: FirePower FP-135 and 165 Controls

4.03 Gas Metal Arc Welding (GMAW)

See Welding Guidelines included in this manual.

Make all necessary connections as instructed in the INSTALLATION chapter.

Place the WELD VOLTAGE RANGE SWITCH at the desired setting.

CAUTION

Do not turn the WELD VOLTAGE RANGE SWITCH clockwise past position 4, as damage to the switch may occur.

Plug the supply cord into a 120 VAC 40 Ampere receptacle for the FP-125, 120 VAC 50 Ampere receptacle for the 135 and into a 230 VAC 30 Ampere receptacle for the FP-165.

Open the gas cylinder valve to supply shielding gas to the gun. (optional gas regulator required on the FP-125)

Connect the WORK CLAMP to the workpiece (material to be welded).

Rotate the WIRE SPEED control to the desired setting.

Extend wire from the gun, and cut to proper stick-out for that type of wire (when welding always maintain this distance).

Position gun to where it is at approximately right angles to the workpiece with proper wire stick-out. Lower your welding helmet and pull the gun trigger switch.

WARNING

Be sure to put on proper protective clothing and eye safeguards (welding coat, apron, gloves, and welding helmet with proper lenses installed). See Safety Instructions and Warnings chapter included in this manual. Neglect of these precautions may result in personal injury.

Travel at a speed necessary to maintain a bead width from 1/8" to ¼" (3mm to 6mm) depending on the thickness of the material. For material that may require larger weldments, either change to a larger diameter filler wire or use multi pass beads. On some applications, it may be necessary to adjust the voltage range to stabilize the arc.

Upon completion of the weld, release the gun trigger switch, raise the welding helmet, and visually examine the weld.

NOTE

To help you overcome any problems that might arise, you will find useful information in section 4.06 Basic Welding Techniques.

4.04 Flux Cored Arc Welding (FCAW)

Follow the same general procedure as with the GMAW process above. Shielding gas is not required for self shielded type wires. For differences in the process see section 4.06 Basic Welding Techniques. Also included is information to solve any problem related to the FCAW process.

4.05 Shutdown Procedures

Close the cylinder valve (GMAW process only). Press gun switch to vent gas line (GMAW process only). Place the POWER ON/OFF SWITCH in the OFF position.

WARNING

After releasing the gun switch, the electrode wire will remain electrically "hot" for several seconds.

4.06 Basic Welding Technique

General

Two different welding processes are covered in this section, with the intention of providing the very basic concepts in using the semi-automatic mode of welding. In this mode, the welding gun is hand-held. The electrode (welding wire) is then fed into a weld puddle and the arc is shielded by a gas or gas mixture.

Setting of the Power Supply

The settings of the FirePower requires some practice by the operator in that the welding Power Supply has two control settings that need to balance. These are the Wire Speed control and the Voltage Control switches. The welding current is determined by the Wire Speed control (i.e., the current will increase with increased wire speed, resulting in a shorter arc). Slower wire speed will reduce the current and lengthen the arc. Increasing the welding voltage hardly alters the welding current level, but lengthens the arc. By decreasing the voltage, a shorter arc is obtained with little change in welding current.

When changing to a different electrode wire diameter, different control settings are required. A thinner electrode wire needs more wire speed to achieve the same current level.

A satisfactory weld cannot be obtained if the wire speed and voltage switch settings are not adjusted to suit the electrode wire diameter and dimensions of the work piece.

If the wire speed is too high for the welding voltage, “stubbing” will occur as the wire dips into the molten pool and does not melt. Welding in these conditions normally produces a poor weld due to lack of fusion. If however, the welding voltage is too high, large drops will form on the end of the electrode wire, causing spatter. The correct setting of voltage and wire speed can be seen in the shape of the weld deposit and heard by a smooth regular arc sound.

GAS METAL ARC WELDING (GMAW)

This process, also known as MIG welding, CO2 welding, Micro Wire Welding, short arc welding, dip transfer welding, wire welding etc., is an electric arc welding process which fuses together the parts to be welded by heating them with an arc between a solid, continuous, consumable electrode and the work. Shielding is obtained from an externally supplied gas or gas mixture. The process is normally applied semi-automatically; however the process may be operated automatically and can be machine operated. The process can be used to weld thin and fairly thick steels, and some non-ferrous metals in all positions.

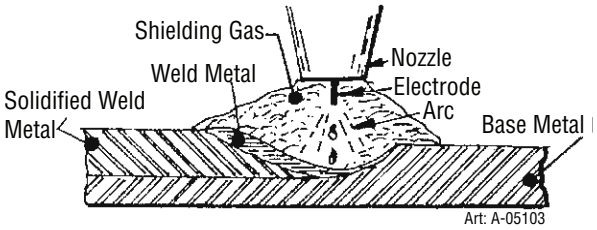


Figure 4-3: GMAW Process

FLUX CORED ARC WELDING (FCAW)

This process also known as Open arc, Innershied, FAB Shield, etc., is an electric arc welding process which fuses together the parts to be welded by heating them with an arc between a continuous flux filled electrode wire and the work. Shielding is obtained through decomposition of the flux within the tubular wire. The process is normally applied semi-automatically; however the process may be applied automatically or by machine. It is commonly used to weld large diameter electrodes in the flat and horizontal position and small electrode diameters in all positions. The process is used to a lesser degree for welding stainless steel and for overlay work.

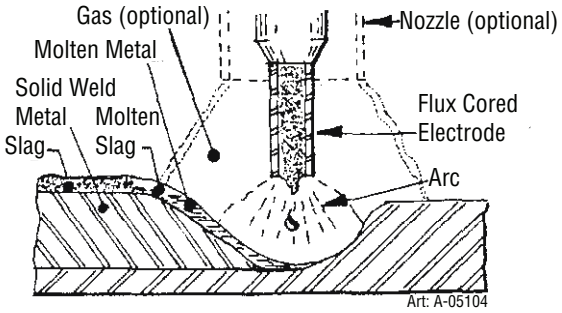


Figure 4-4: FCAW Process

WARNING

Follow these instructions only after referring to the Safety Instructions and Warnings chapter of this manual, and the instructions in the Installation chapter

Check List Before Starting

POLARITY – DCEP (Direct Current Electrode Positive) or DCEN (Direct Current Electrode Negative)

WIRE FEED SPEED – 1 to 10

VOLTAGE RANGE SWITCH SETTING – 1 to 4 for FP-135, 165 an two switches and1-2 and Low-High for FP-125.

GAS FLOW RATE – 15 to 25 CFH (If shielding gas is required)

ELECTRODE WIRE STICK-OUT – approx 3/8" (10mm)

4.07 Welding Gun Positions

The welding gun should be held at an angle to the weld joint (see Secondary Adjustment Variables in Section 4.08). Hold the gun so that the welding seam is viewed at all times. Always wear the welding helmet with proper filter lenses.

CAUTION

Do not pull the welding gun back when the arc is established. This will create excessive wire extension (stickout) and make a very poor weld.

The electrode wire is not energized until the gun trigger switch is depressed. The wire may therefore be placed on the seam or joint prior to lowering the helmet.

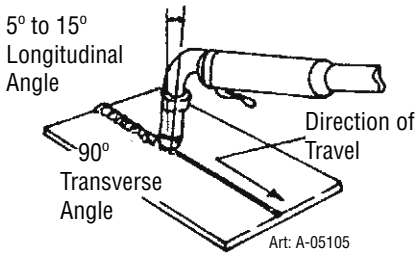


Figure 4-5: Butt and Horizontal Welds

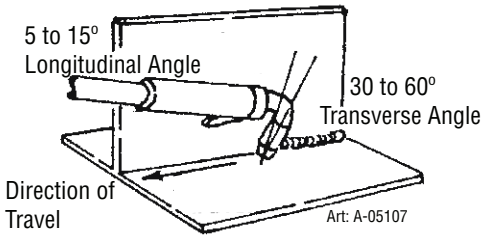


Figure 4-7: Horizontal Fillet Weld

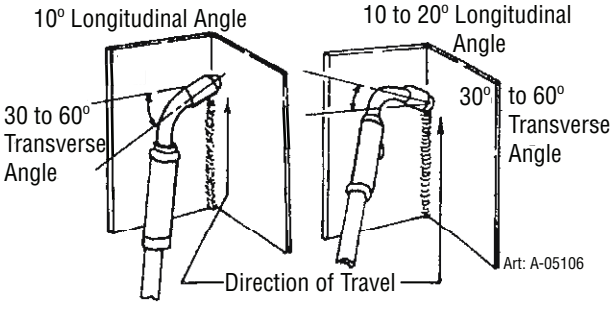


Figure 4-6: Vertical Weld

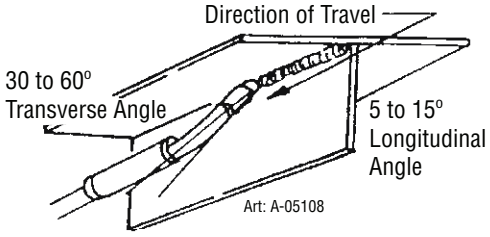


Figure 4-8: Overhead

4.08 MIG Welding (GMAW) Variables

Most of the welding done by all processes is on carbon steel. The following items describe the welding variables in short-arc welding of 24 gauge (0.024", 0.6mm) to ¼" (6.4mm) mild sheet or plate. The applied techniques and end results in the GMAW process are controlled by these variables.

Pre-selected Variables

Pre-selected variables depend upon the type of material being welded, the thickness of the material, the welding position, the deposition rate and the mechanical properties. These variables are:

1. Type of electrode wire
2. Size of electrode wire
3. Type of gas (not applicable to self-shielding wires FCAW)
4. Gas flow rate (not applicable to self-shielding wires FCAW)

Primary Adjustable Variables

These control the process after Pre-selected Variables have been found. They control the penetration, bead width, bead height, arc stability, deposition rate and weld soundness. They are:

1. Arc Voltage
2. Welding Current (wire feed speed)
3. Travel Speed

Secondary Adjustable Variables

These variables cause changes in primary adjustable variables which in turn cause the desired change in the bead formation. They are:

1. Stickout—distance between the end of the contact tube (tip) and the end of the electrode wire. Keep this at about 3/8" (10mm) stickout (as shown in Figure 4-8).

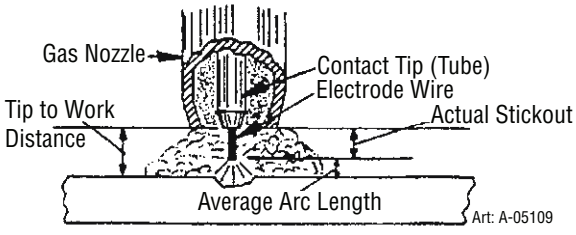


Figure 4-9: Electrode Stick-Out

2. Wire Feed Speed. Increase in wire feed speed increases weld current. Decrease in wire feed speed decreases weld current.
3. Nozzle Angle. (Figures 4-9 and 4-10) This refers to the position of the welding gun in relation to the joint. The transverse angle is usually one half the included angle between plates forming the joint. The longitudinal angle is the angle between the center line of the welding gun and a line perpendicular to the axis of the weld. The longitudinal angle is generally called the Nozzle Angle and can be either trailing (pulling) or leading (pushing). Whether the operator is left-handed or right-handed has to be considered to realize the effects of each angle in relation to the direction of travel.

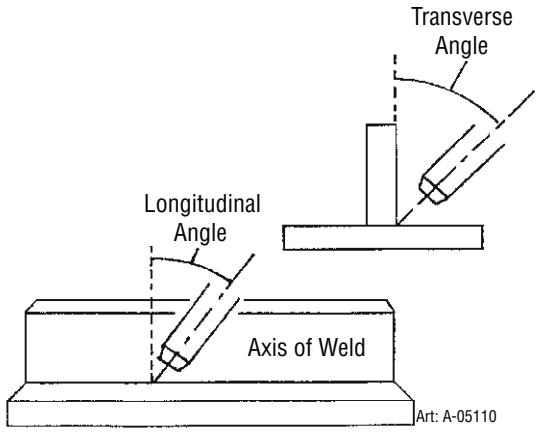


Figure 4-10: Transverse and Longitudinal Nozzle Axes

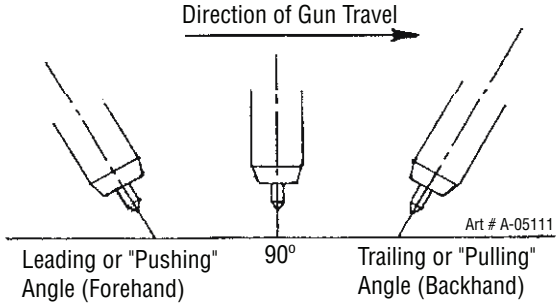


Figure 4-11: Nozzle Angle, Right-Handed Operator

4.09 Establishing the Arc and Making Weld Beads

Before attempting to weld on a finished piece of work, it is recommended that practice welds be made on a sample metal of the same material as that of the finished piece.

The easiest MIG welding procedure for the beginner to experiment with, is the flat position. This equipment is capable of flat, vertical and overhead positions.

For practicing MIG welding, secure some pieces of 16 or 18 gauge (0.06" 1.5mm or 0.08" 2.0mm) mild steel plate 6" x 6" (150 x 150mm). Use 0.024" (0.6mm) wire and 75% Argon / 25% CO2 shielding gas.

4.10 Pre-Weld Procedure

1. Check the OPERATION chapter of this manual for details on this equipment.
2. Set the welding voltage range switch at position 1 or 2.
3. Set the wire feed speed control to about the 2.5 setting. Readjust as necessary.
4. Adjust the gas flow rate to about 20 cubic feet per hour (15 - 20 lpm).
5. Review standard safe practice procedures in ventilation, eye and face protection, fire, compressed gas and preventative maintenance. See Safety Instructions and Warnings chapter included in this manual.

4.11 Welding Procedure

1. Maintain the tip to work distance (stickout) at 5/16" to 3/8" (8 to 9mm) at all times.
2. For transverse and longitudinal nozzle angles, see section 4.07 Welding Gun Positions.
3. Hold the gun about 3/8" (9mm) from the work, lower the helmet by shaking your head and squeeze the trigger to start the wire feeding, and establish the arc.

NOTE

Get in the habit of shaking the helmet down, rather than using the hands. One hand must hold the gun, and the other is often needed to hold pieces to be tacked or positioned.

4. Make a single down-hand (pulling) stringer weld bead.
5. Practice welding beads. Start at one edge and weld across the plate to the opposite edge.

NOTE

When the equipment is properly adjusted, a rapidly cracking or hissing sound of the arc is a good indicator of correct arc length.

6. Practice stopping in the middle of the plate, restarting into the existing weld crater and continuing the weld bead across the plate.

NOTE

When the gun trigger is released after welding, the electrode forms a ball on the end. To the new operator, this may present a problem in obtaining the penetration needed at the start of the next weld. This can be corrected by cutting the ball off with wire cutters.

4.12 Reference Tables

The following tables are provided as user aids when performing MIG or FLUX CORED welding.

Type of Gas	Typical Mixtures	Primary Uses
Carbon Dioxide (CO2)		Mild and low alloy steels
Argon (Ar) - Carbon Dioxide (CO2)	75% Ar – 25% CO2	Mild and low alloy steelsStainless Steel
Argon (Ar)		Aluminum

Table 4-1: Type of Gas

Result Desired	Welding Variable						
	Arc Voltage	Welding Current (wire speed)	Travel Speed	Nozzle Angle	Stick out	Wire size	Gas Type
Deeper Penetration		[1]Increase		[3]Trailing Max 25°	[2]Decrease	[5]Smaller (*)	[4]CO_2
Shallower Penetration		[1]Decrease		[3]Leading	[2]Increase	[5]Larger	[4]Ar CO_2 mix
Larger Bead		[1]Increase	[2]Decrease		[3]Increase (*)		
Smaller Bead		[2]Decrease	[2]Increase		[3]Decrease (*)		
Higher Narrower Bead	[1]Decrease			[2]Trailing	[3]Increase		
Flatter Wider Bead	[1]Increase			[2]90° or Leading	[3]Decrease		
Faster Deposition Rate		[1]Increase			[2]Increase (*)	[3]Smaller	
Slower Deposition Rate		[1]Decrease			[2]Decrease (*)	[3]Larger	

Key: (1) First Choice, (2) Second Choice, (3) Third Choice, (4) Fourth Choice, (5) Fifth Choice

Table 4-2: Welding Variables

NOTE

Same adjustment is required for wire feed speed.

* When these variables are changed, the wire feed speed must be adjusted so that the welding current remains constant. See DEPOSITION RATE in the WELDING VARIABLES section. This change is especially helpful on materials of 20 gauge (.04” 1mm approximately) and smaller in thickness.

4.13 FirePower 125 Welding Setting Selection Guide

Material Type	Wire Type	Shielding Gas and Flow Rate	Wire Size (Diameter)
Steel	Solid (or hard) ER70S-6	100% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
		75% Ar 25% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
Steel	Flux Core E71T-GS	None Required	.030" (0.8mm) .035" (0.9mm)

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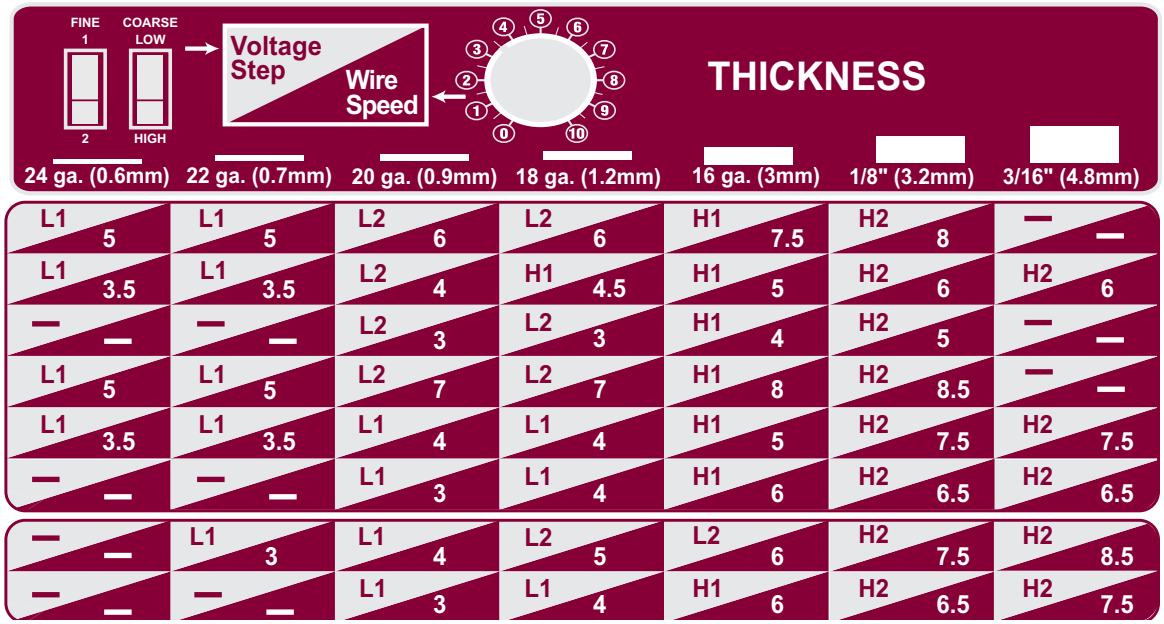

Figure 4-12: FP-125 Selection Guide

4.14 FirePower 135 Welding Setting Selection Guide

Material Type	Wire Type	Shielding Gas and Flow Rate	Wire Size (Diameter)
Steel	Solid (or hard) ER70S-6	100% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
		75% Ar 25% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
Steel	Flux Core E71T-GS	None Required	.030" (0.8mm) .035" (0.9mm)
Stainless Steel	Stainless Steel ER 308L	98% Ar 2% CO_2 35cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)

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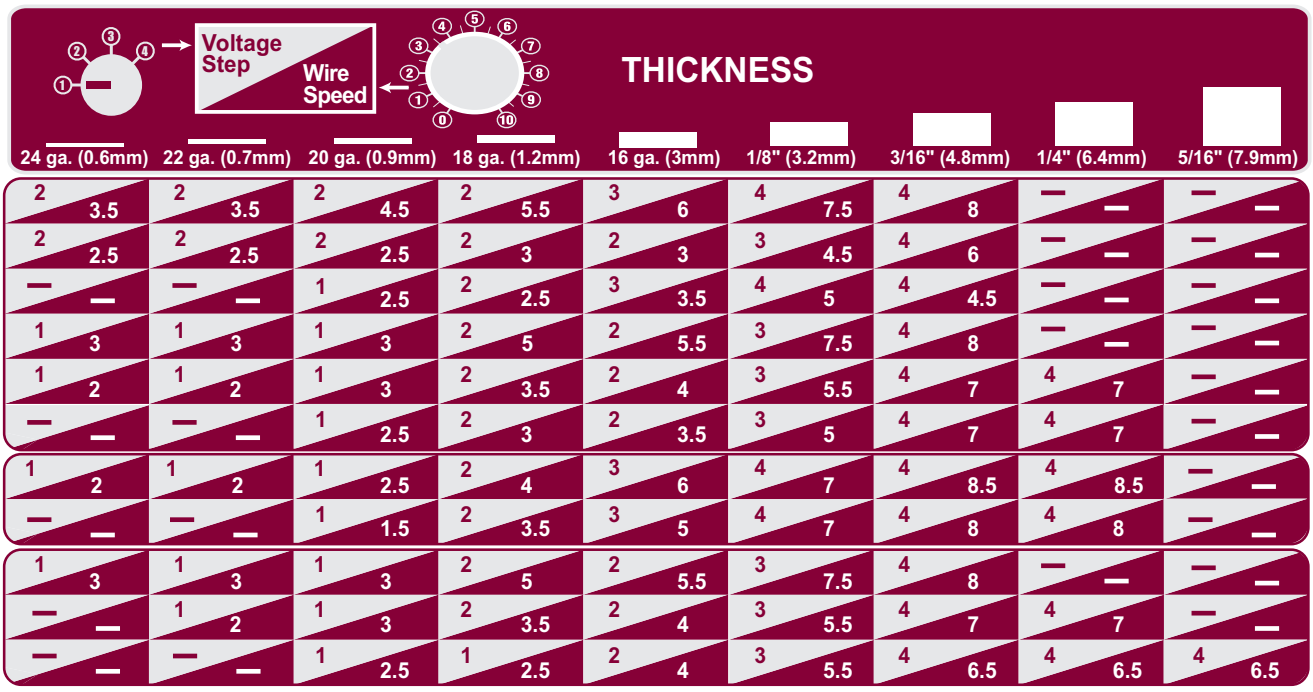

Figure 4-13: FP-135 Selection Guide

4.15 FirePower 165 Welding Setting Selection Guide

Material Type	Wire Type	Shielding Gas and Flow Rate	Wire Size (Diameter)
Steel	Solid (or hard) ER70S-6	100% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
		75% Ar 25% CO_2 25cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)
Steel	Flux Core E71T-GS	None Required	.030" (0.8mm) .035" (0.9mm)
Stainless Steel	Stainless Steel ER 308L	98% Ar 2% CO_2 35cfh	.023" (0.6mm) .030" (0.8mm) .035" (0.9mm)

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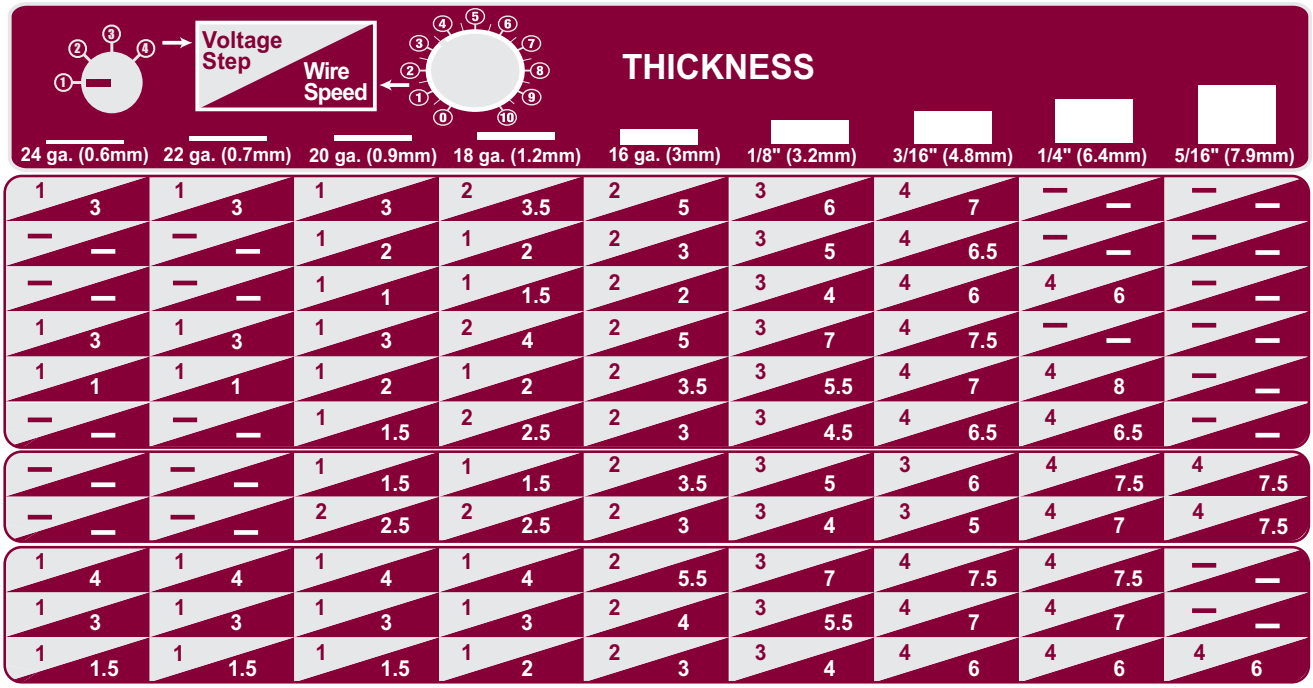


Figure 4-14: FP-165 Selection Guide

4.16 Gas Selection for Gas Metal Arc Welding

Metal Type	Base Plate Thickness	Filler Metal	Transfer Mode	Suggested Shielding Gas	Welding Positions	Comments
Carbon Steel	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	100% CO_2	All Position Welding	High welding speeds. Good penetration and pool control.
	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	75% Argon 25% CO2	All Position Welding	Suitable for high-current and high-speed welding.
	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	92% Argon 8% CO2	All Position Welding	Higher deposition rates without melt-through. Minimum distortion and spatter. Good pool control for out-of-position welding.
	Greater than 10 gauge	ER70S-X	Spray Transfer	92% Argon 8% CO2	Flat & HV Fillet	Good arc stability, weld soundness, and increasing width of fusion.
Low Alloy and High Alloy Steel	Greater than 22 gauge (.030")	See Note 1	Short Circuit Globular	75% Argon 25% CO2	All Position Welding	High welding speeds. Good penetration and pool control. Applicable for out-of-position welds. Suitable for high-current and high-speed welding.
	Greater than 22 gauge (.030")	See Note 1	Short Circuit	92% Argon 8% CO2	All Position Welding	Good coalescence and bead contour. Good mechanical properties.
	Greater than 3/32"	See Note 1	Spray transfer	92% Argon 8% CO2	Flat & HV Fillet	Reduces undercutting. Higher deposition rates and improved bead wetting. Deep penetration and good mechanical properties.
	Greater than 14 gauge (.075")	See Note 1	Short Circuit	98% Argon 2% CO2	All Position Welding	Good control of melt-through and distortion. Used also for spray arc welding. Pool fluidity sometimes sluggish depending on the base alloy.
Stainless Steel	Greater than 22 gauge (.030")	ER308-X ER309-X ER316-X	Short Circuit	90% Helium 7.5% Argon 2.5% CO2 or 81% Argon 18% Helium 1 % CO2	All Position Welding	Low CO_2 percentages in Helium mix minimizes carbon pickup, which can cause intergranular corrosion with some alloys. Helium improves wetting action and contour. CO_2 percentages above 5% should be used with caution on some alloys.
	Greater than 3/32"	ER308-X ER309-X ER316-X	Spray Transfer	90% Helium 7.5% Argon 2.5% CO2 or 81% Argon 18% Helium 1 % CO2	Flat & HV Fillet	Good arc stability. Produces a fluid but controllable weld pool, good coalescence, and bead contour. Minimizes undercutting on heavier thickness.
Aluminum	Greater than 18 gauge (.045")	ER4043 ER5356	Spray Transfer	Argon	All Position Welding	Excellent cleaning action. Provides more stable arc than helium-rich mixtures.

Note 1: Contact your Filler Metal Supplier for recommended filler metal for the base metal to be welded.

Table 4-3: Gas Selection GMAW

SECTION 5: SERVICE

5.01 Cleaning of the Unit

Periodically remove the right side panel (after disconnecting the supply cord from the receptacle) and blow out the interior with clean, dry, compressed air of not more than 25 PSI air pressure. Do not strike any components with the air hose nozzle.

5.02 Cleaning of the Feed Rolls

Clean the wire groove on the feed roll at frequent intervals. This cleaning operation can be done by using a small wire brush. To clean the wire groove, loosen the pressure device and lift the feedroll pressure arm. Remove all wire from the feedhead. Wipe off the bearing roll (the "top" roll in the feedhead).

5.03 Basic Troubleshooting

The basic level of troubleshooting is that which can be performed without special equipment or knowledge, and without removing the covers from the Power Source.

If major components are faulty, then the Power Source should be returned to an Accredited THERMAL ARC Service Agent for repair.

5.04 Solving Problems Beyond the Welding Terminals

The general approach to fix Gas Metal Arc Welding (GMAW) problems is to start at the wire spool then work through to the MIG torch. There are two main areas where problems occur with GMAW:

1. Porosity

When there is a gas problem the result is usually porosity within the weld metal. Porosity always stems from some contaminant within the molten weld pool which is in the process of escaping during solidification of the molten metal.

Contaminants range from no gas around the welding arc to dirt on the work piece surface. Porosity can be reduced by checking the following points:

1. *Gas cylinder contents and flow meter.*
   a. Ensure that the gas cylinder is not empty and the flow meter is correctly adjusted to 20CFM (15 liters per minute).
2. *Gas leaks*
   a. Check for gas leaks between the regulator/cylinder connection and in the gas hose to the Power Source.
3. *Internal gas hose in the Power Source.*
   a. Ensure the hose from the solenoid valve to the MIG torch adaptor has not fractured and that it is connected to the MIG torch adaptor.
4. *Welding in a windy environment.*
   a. Shield the weld area from the wind or increase the gas flow.
5. *Welding dirty, oily, painted, oxidized or greasy plate.*
   a. Clean contaminates off the plate.
6. *Distance between the MIG torch nozzle and the work piece.*
   a. Keep the distance between the MIG torch nozzle and the work piece to a minimum.
7. *Maintain the MIG torch in good working order.*
   a. Ensure that the gas holes are not blocked and gas is exiting out of the torch nozzle. Refer to WARNING below.
   b. Do not restrict gas flow by allowing spatter to build up inside the MIG torch nozzle.

WARNING

Disengage the drive roll when testing for gas flow by ear.

2. Inconsistent wire feed

Wire feeding problems can be reduced by checking the following points:

1. *Wire spool brake is too tight.*
    a. Feed roller driven by motor in the cabinet will slip.
2. *Wire spool brake is too loose.*
    a. Wire spool can unwind and tangle.
3. *Worn or incorrect feed roller size.*
    a. Use 'U' groove drive feed roller matched to the aluminum wire size you are welding. Use 'V' groove drive feed roller matched to the steel wire size you are welding. Use 'knurled V' groove drive feed roller matched to the flux cored wire size you are welding.
4. *Misalignment of inlet/outlet guides.*
    a. Wire will rub against the misaligned guides and reduces wire feedability.
5. *Liner blocked with slag.*
    a. Slag is produced by the wire passing through the feed roller, if excessive pressure is applied to the pressure roller adjuster. Slag can also be produced by the wire passing through an incorrect feed roller groove shape or size. Slag is fed into the liner where it accumulates, thus reducing wire feedability.
6. *Incorrect or worn contact tip.*
    a. The contact tip transfers the weld current to the electrode wire. If the hole in the contact tip is too large, then arcing may occur inside the contact tip resulting in the electrode wire jamming in there. When using soft electrode wire such as aluminum, the wire may become jammed in the contact tip due to expansion of the wire when heated. A contact tip designed for soft electrode wires should be used.
7. *Poor work lead contact to work piece.*
    a. If the work lead has a poor electrical contact to the work piece, then the connection point will heat up and result in a reduction of power at the arc.
8. *Bent liner.*
    a. This will cause friction between the wire and the liner thus reducing wire feedability

5.05 Welding Problems

	FAULT		CAUSE		REMEDY
1	Undercut.	A	Welding arc voltage too high.	A	Reduce voltage by reducing the voltage selection switch position or increase the wire feed speed.
		B	Incorrect torch angle	B	Adjust angle
		C	Excessive heat input	C	Increase the torch travel speed and/or reduce welding current by reducing the voltage selection switch position or reducing the wire feed speed.
2	Lack of penetration.	A	Welding current too low	A	Increase welding current by increasing wire feed speed and increasing voltage selection switch position.
		B	Joint preparation too narrow or gap too	B	Increase joint angle or gap
		C	Shielding gas incorrect	C	Change to a gas which gives higher penetration
3	Lack of fusion.		Voltage too low		Increase voltage by increasing voltage selection switch position.
4	Excessive spatter.	A	Voltage too high	A	Lower voltage by reducing the voltage selection switch or increase wirespeed control.
		B	Voltage too low	B	Raise voltage by increasing the voltage selection switch or reduce wirespeed control.
5	Irregular weld shape.	A	Incorrect voltage and current settings. Convex = voltage too low. Concave = voltage too high.	A	Adjust voltage and current by adjusting the voltage selection switch and the wirespeed control.
		B	Wire is wandering	B	Replace contact tip
		C	Incorrect shielding gas	C	Check shielding gas
		D	Insufficient or excessive heat input	D	Adjust the wirespeed control or the voltage selection switch

Table 5-1a: Welding Problems

	FAULT		CAUSE		REMEDY
6	Weld cracking	A	Weld beads too small	A	Decrease travel speed
		B	Weld penetration narrow and deep	B	Reduce current and voltage and increase MIG torch travel speed or select a lower penetration shielding gas.
		C	Excessive weld stresses	C	Increase weld metal strength or revise design
		D	Excessive voltage	D	Decrease voltage by reducing the voltage selection switch.
		E	Cooling rate too fast	E	Slow the cooling rate by preheating part to be welded or cool slowly.
7	Cold weld puddle	A	Faulty rectifier unit	A	Have an Accredited THERMAL ARC Service Agent to test then replace the faulty component.
		B	Loose welding cable connection.	B	Check all welding cable connections.
		C	Low Primary Voltage	C	Contact supply authority
8	Arc does not have a crisp sound that short arc exhibits when the wirefeed speed and voltage are adjusted correctly.		The MIG torch has been connected to the wrong voltage polarity on the front panel.		Connect the MIG torch to the positive (+) welding terminal for solid wires and gas shielded flux cored wires. Refer to the electrode wire manufacturer for the correct polarity.
9	Thermal overtemperature light illuminatesduring welding, but fan motor continues to run.		The machine duty cycle has been exceeded.		Allow the fan to run, to allow the machine to cool down.
10	Thermal overtemperature light illuminates in less than 30 seconds during welding		Fan has stopped running or fuse on PCB has blown.		Have an accredited THERMAL ARC Service Agent replace the fan motor or fuse.

APPENDIX 1: OPTIONS AND ACCESSORIES

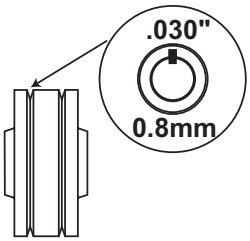
- Contact your Thermal Arc distributor to order options and accessories. For assistance in locating a Thermal Arc distributor, contact the Thermadyne office listed in the inside rear cover that is nearest to you.
- Note the model and specification number shown on the equipment nameplate.

For Tweco/Victor Inquiries and Orders:

Call 1-800-318-6819 Consumable Parts Management Group

Replacement Torch Catalog number 1444-0741

FEED ROLL INSTALLATION & CONSUMABLE GUIDE



Wire Feed Rolls & MIG Gun Consumables

The branding size at the end of the feedroll refers to the size nearest to the mark.

Part No.	Description
1444-0427	Wire Feed Roll, Knurle, .023" - .030" /.035" (0.6-0.8mm/0.9mm), Hard/Cored
1444-0050	Nozzle
1444-0025	Contact Tip, .023" (0.6mm)
1444-0026	Contact Tip, .030" (0.8mm)
1444-0027	Contact Tip, .035" (0.9mm)
1444-0489	Gas Diffuser
1444-0741	MIG Gun, Complete Assembly

Weld Wires

Part No.	Description
1444-0210	ER70S-6 Mild Steel Wire, .023" (0.6mm), 2 lbs. (0.9kg) Spool
1444-0211	ER70S-6 Mild Steel Wire, .023" (0.6mm), 11 lbs. (5kg) Spool
1444-0215	ER70S-6 Mild Steel Wire, .030" (0.8mm), 2 lbs. (0.9kg) Spool
1444-0216	ER70S-6 Mild Steel Wire, .030" (0.8mm), 11 lbs. (5kg) Spool
1444-0220	ER70S-6 Mild Steel Wire, .035" (0.9mm), 2 lbs. (0.9kg) Spool
1444-0221	ER70S-6 Mild Steel Wire, .035" (0.9mm), 11 lbs (5kg) Spool
1444-0230	E71T-GS Flux Cored Wire, .030" (0.8mm), 2 lbs (0.9kg) Spool
1444-0231	E71T-GS Flux Cored Wire, .030" (0.8mm), 10 lbs (4.5kg) Spool
1444-0235	E71T-GS Flux Cored Wire, .035" (0.9mm), 2 lbs (0.9kg) Spool
1444-0236	E71T-GS Flux Cored Wire, .035" (0.9mm), 10 lbs (4.5kg) Spool

Art # A-09026

Figure A-1: FP-125 Feed Roll and Consumables Chart

FEED ROLL INSTALLATION & CONSUMABLE GUIDE FP-135

Wire Feed Rolls & MIG Gun Consumables

The branding size at the end of the feedroll refers to the size nearest to the mark.

Part No.	Description
1444-0427	Wire Feed Roll, Knurle, .023" - .030" /.035" (0.6-0.8mm/0.9mm), Hard/Cored
1444-0050	Nozzle
1444-0025	Contact Tip, .023" (0.6mm)
1444-0026	Contact Tip, .030" (0.8mm)
1444-0027	Contact Tip, .035" (0.9mm)
1444-0489	Gas Diffuser
1444-0741	MIG Gun, Complete Assembly

Weld Wires

Part No.	Description
1444-0210	ER70S-6 Mild Steel Wire, .023" (0.6mm), 2 lbs. (0.9kg) Spool
1444-0211	ER70S-6 Mild Steel Wire, .023" (0.6mm), 11 lbs. (5kg) Spool
1444-0215	ER70S-6 Mild Steel Wire, .030" (0.8mm), 2 lbs. (0.9kg) Spool
1444-0216	ER70S-6 Mild Steel Wire, .030" (0.8mm), 11 lbs. (5kg) Spool
1444-0220	ER70S-6 Mild Steel Wire, .035" (0.9mm), 2 lbs. (0.9kg) Spool
1444-0221	ER70S-6 Mild Steel Wire, .035" (0.9mm), 11 lbs (5kg) Spool
1444-0230	E71T-GS Flux Cored Wire, .030" (0.8mm), 2 lbs (0.9kg) Spool
1444-0231	E71T-GS Flux Cored Wire, .030" (0.8mm), 10 lbs (4.5kg) Spool
1444-0235	E71T-GS Flux Cored Wire, .035" (0.9mm), 2 lbs (0.9kg) Spool
1444-0236	E71T-GS Flux Cored Wire, .035" (0.9mm), 10 lbs (4.5kg) Spool

Figure A-2: FP-135 Feed Roll and Consumables Chart

FEED ROLL INSTALLATION & CONSUMABLE GUIDE FP-165

Wire Feed Rolls & MIG Gun Consumables

The branding size at the end of the feedroll refers to the size nearest to the mark.

Part No.	Description
1444-0427	Wire Feed Roll, Knurle, .023" - .030" /.035" (0.6-0.8mm/0.9mm), Hard/Cored
1444-0050	Nozzle
1444-0025	Contact Tip, .023" (0.6mm)
1444-0026	Contact Tip, .030" (0.8mm)
1444-0027	Contact Tip, .035" (0.9mm)
1444-0489	Gas Diffuser
1444-0741	MIG Gun, Complete Assembly

Weld Wires

Part No.	Description
1444-0210	ER70S-6 Mild Steel Wire, .023" (0.6mm), 2 lbs. (0.9kg) Spool
1444-0211	ER70S-6 Mild Steel Wire, .023" (0.6mm), 11 lbs. (5kg) Spool
1444-0215	ER70S-6 Mild Steel Wire, .030" (0.8mm), 2 lbs. (0.9kg) Spool
1444-0216	ER70S-6 Mild Steel Wire, .030" (0.8mm), 11 lbs. (5kg) Spool
1444-0220	ER70S-6 Mild Steel Wire, .035" (0.9mm), 2 lbs. (0.9kg) Spool
1444-0221	ER70S-6 Mild Steel Wire, .035" (0.9mm), 11 lbs (5kg) Spool
1444-0230	E71T-GS Flux Cored Wire, .030" (0.8mm), 2 lbs (0.9kg) Spool
1444-0231	E71T-GS Flux Cored Wire, .030" (0.8mm), 10 lbs (4.5kg) Spool
1444-0235	E71T-GS Flux Cored Wire, .035" (0.9mm), 2 lbs (0.9kg) Spool
1444-0236	E71T-GS Flux Cored Wire, .035" (0.9mm), 10 lbs (4.5kg) Spool

Figure A-3: FP-165 Feed Roll and Consumables Chart

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APPENDIX 2: REPLACEMENT PARTS

Item	DESCRIPTION	Model Part No.		
		FP-125	FP-135	FP-165
1	TORCH GROMMET	1444-0477	1444-0477	1444-0477
2	FRONT PANEL FP-125 SILK-SCREEN PRINTED	1444-0815	1444-0816	1444-0817
3	PLASTIC HINGE FOR SIDE PANEL	1444-0435	1444-0435	1444-0435
4	SWITCH KNOB, FP-135/165	-	1444-0808	
5	POTENTIOMETER KNOB, FP-125/135/165	1444-0543	1444-0543	1444-0543
6	YELLOW PILOT-LIGHT SWITCH	1444-0440	1444-0440	1444-0440
7	RIGHT COVER PANEL FP-125-135-165	1444-0821	1444-0821	1444-0821
8	FRONT FRAME, FP-125/135/165	1444-0833	1444-0833	1444-0833
9	CAP D.36 FOR MIG 100 LOUVER	1444-0831	1444-0831	1444-0831
10	INPUT POWER CABLE	1444-0433	1444-0433	1444-0463
11	EARTH CLAMP, FP-125/135/165	1445-0966	1445-0966	1445-0966
12	EARTH CABLE, FP-125/135/165	1444-0843	1444-0843	1444-0843
13	LOUVER MIG 100	1444-0830	1444-0830	1444-0830
14	CABLE CLAMP FOR CABLE DIAM.6+ SCREW	1444-0806	1444-0806	1444-0806
15	MIG GUN, FP-125/135/165	1444-0741	1444-0741	1444-0741
16	FEMALE CONNECTOR, 9/16"X18	-	1444-0839	1444-0839
17	GAS REGULATOR, FP-135/165	-	1444-0838	1444-0838
18	GAS HOSE 1,5M + CONN. 9/16" + CLAMPS	1444-0809	1444-0809	1444-0809
19	P.C. BOARD	1444-0483	1444-0483	1444-0465
20	MOTOR & GEARBOX, FP-135	-	1444-0803	W7004002
21	RECTIFIER	1444-0836	1444-0836	1444-0837
22	THERMOSTAT, RECTIFIER	1444-0456	1444-0456	1444-0443
23	FAN KIT	1444-0486	1444-0486	W7004008
24	CABLE CLAMP	1444-0807	1444-0807	1444-0428
25	PLASTIC FOOT	1444-0495	1444-0495	1444-0495
26	TRANSFORMER	1444-0844	1444-0462	1444-0469
27	CHOKE	1444-0846	1444-0847	1444-0728
28	SWITCH 17A	-	1444-0852	1444-0835
29	HOSE CONNECTOR D.4-HOSEHOLDER D.6 + NUTS	1444-0840	1444-0840	1444-0840
30	SPOOL HOLDER	1444-0800	1444-0800	1444-0800
31	MILD STEEL WIRE REEL	1444-0500	1444-0500	1444-0500
32	HANDLE, FP-125/135/165	1444-0828	1444-0828	1444-0828
33	WIRE FEEDER	1444-0848	1444-0850	1444-0491
34	WIRE FEED ROLL	-	1444-0427	1444-0427
34b	WIRE FEEDING D.28 + PINION	1444-0804	-	-
35	KIT GAS/NO GAS CHANGE BOARD	1444-0802	1444-0802	1444-0802
36	DIVIDING PANEL FP + LABELS	1444-0825	1444-0826	1444-0826
37	DOOR LATCH	1444-0426	1444-0426	1444-0426
38	SIDE PANEL FP SILK+LAB+HINGE+LOCK	1444-0822	1444-0823	1444-0824
39	LOWER PANEL, FP-125/135/165	1444-0490	1444-0490	1444-0490
40	SWITCH 16A, FP-125	1444-0834	-	-
41	THERMOSTAT, XFMER	-	-	1444-0470
42	CONTACTOR *Not shown in art	1444-0498	1444-0498	-
43	BACK PANEL FP SILK-SCREEN PRINTED	1444-0818	1444-0819	1444-0820

Table A-1: FP-125 Replacement Parts List

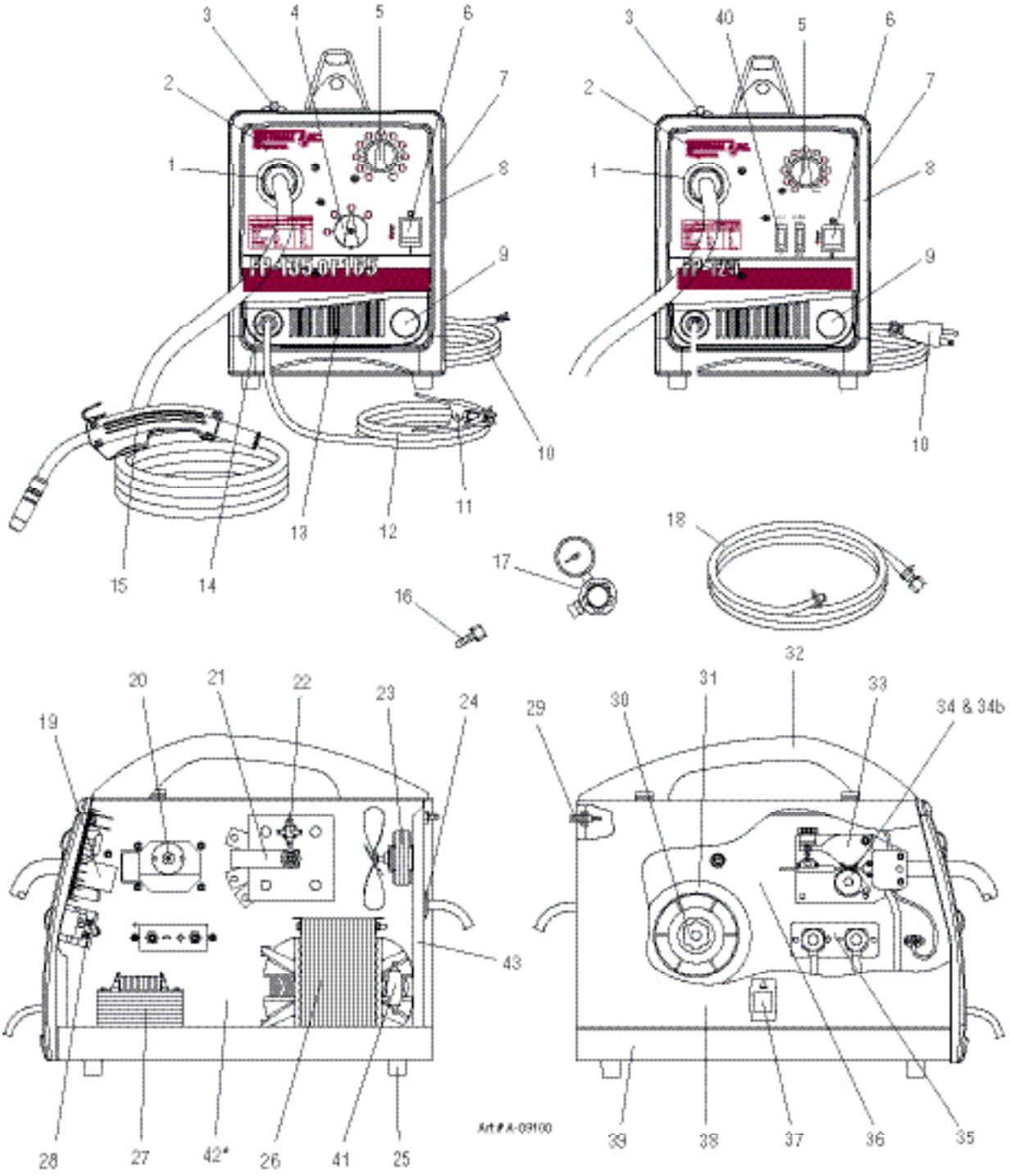
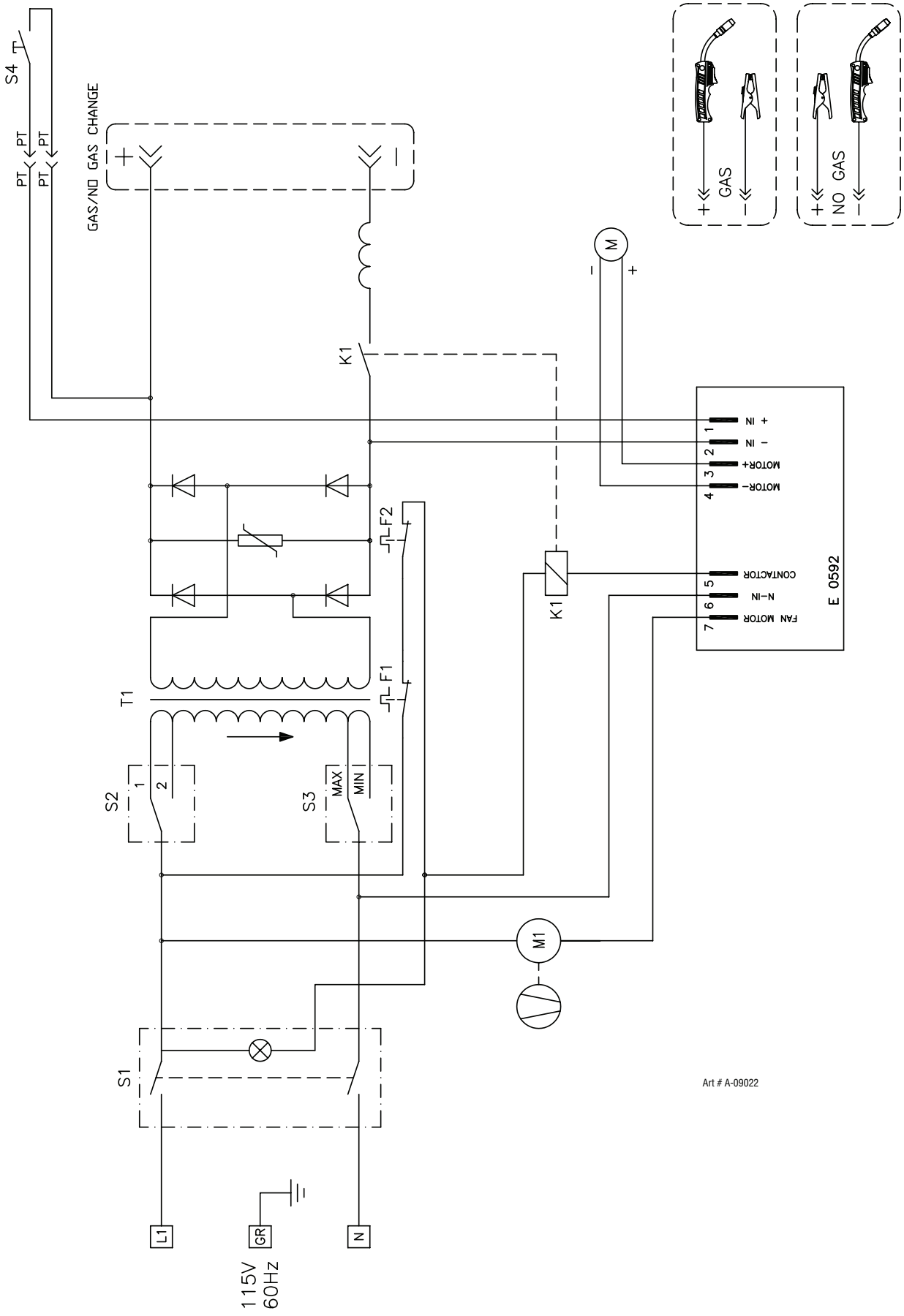
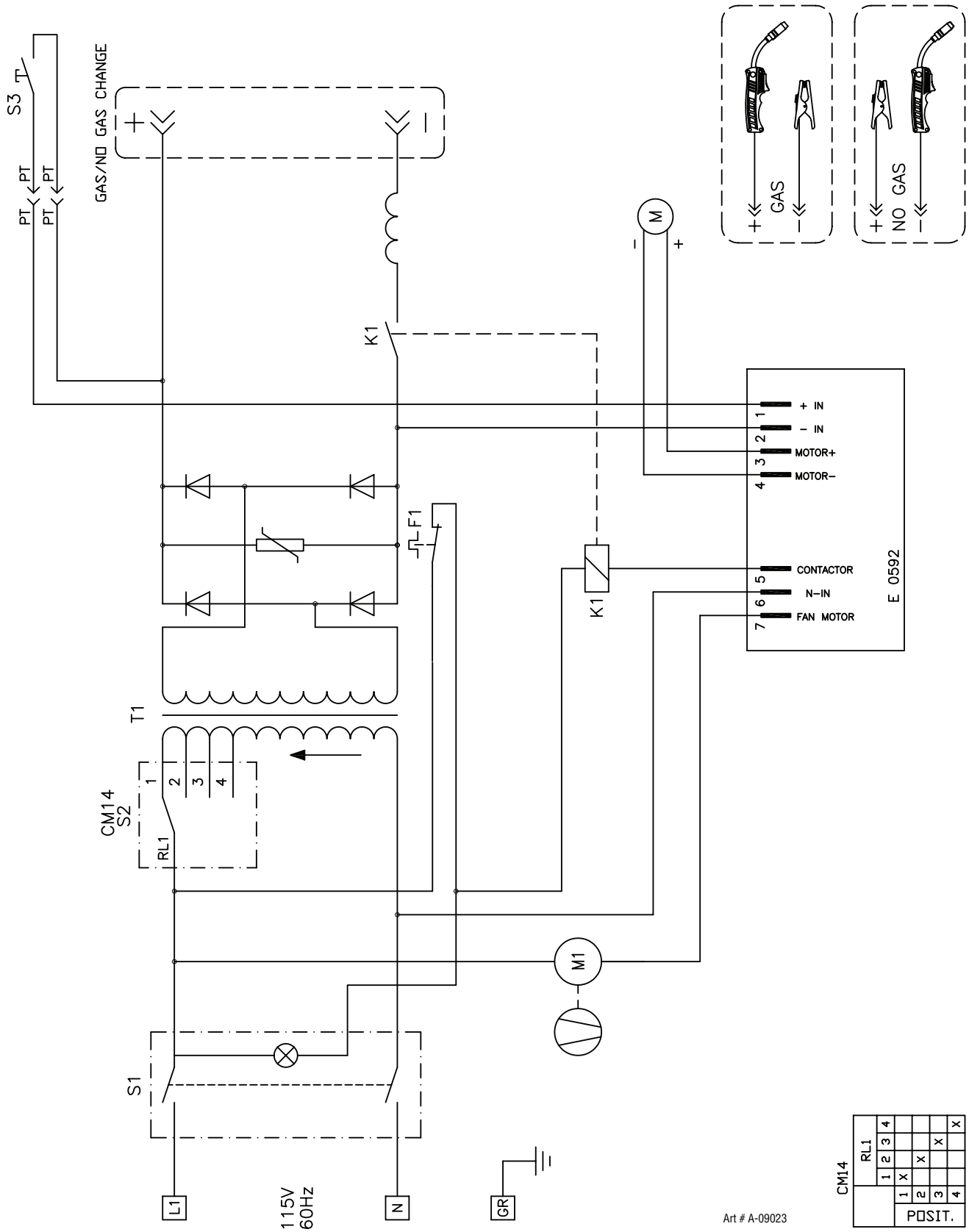


Figure A-4: FP-125-135-165 Replacement Parts Callout

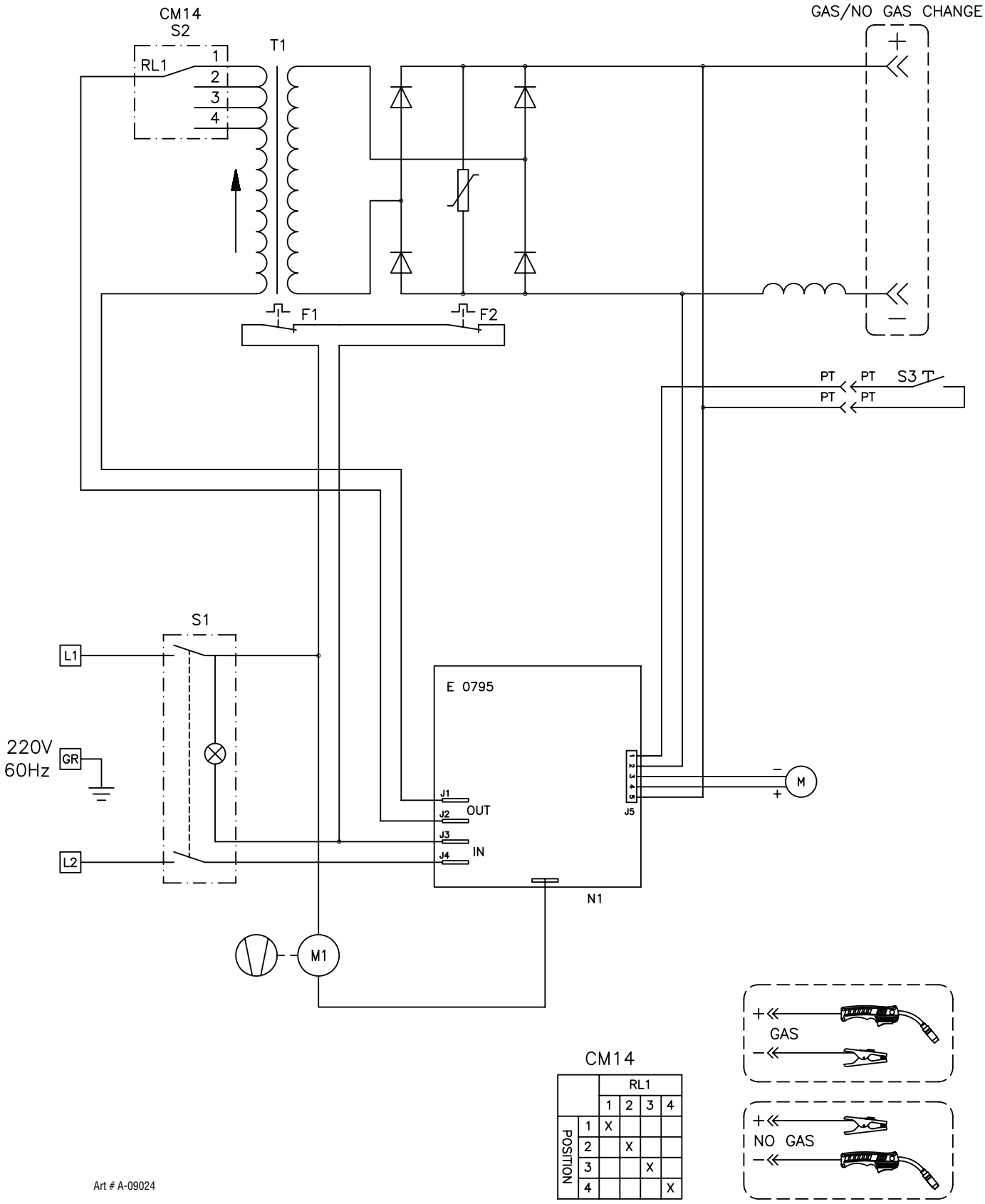
APPENDIX 3: FIREPOWER 125 SYSTEM SCHEMATIC



APPENDIX 4: FIREPOWER 135 SYSTEM SCHEMATIC



APPENDIX 5: FIREPOWER 165 SYSTEM SCHEMATIC



LIMITED WARRANTY

This information applies to Thermal Arc products that were purchased in the USA and Canada.

November 2007

LIMITED WARRANTY: Thermal Arc®, Inc., A Thermadyne Company ("Thermal Arc"), warrants to customers of authorized distributors ("Purchaser") that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the warranty period stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or damage, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

This warranty is exclusive and in lieu of any warranty of merchantability, fitness for any particular purpose, or other warranty of quality, whether express, implied, or statutory.

Limitation of liability: Thermal Arc shall not under any circumstances be liable for special, indirect, incidental, or consequential damages, including but not limited to lost profits and business interruption. The remedies of the purchaser set forth herein are exclusive, and the liability of Thermal Arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc, whether arising out of contract, tort, including negligence or strict liability, or under any warranty, or otherwise, shall not exceed the price of the goods upon which such liability is based.

No employee, agent, or representative of Thermal Arc is authorized to change this warranty in any way or grant any other warranty, and Thermal Arc shall not be bound by any such attempt. Correction of non-conformities, in the manner and time provided herein, constitutes fulfillment of thermal's obligations to purchaser with respect to the product.

This warranty is void, and seller bears no liability hereunder, if purchaser used replacement parts or accessories which, in Thermal Arc's sole judgment, impaired the safety or performance of any Thermal Arc product. Purchaser's rights under this warranty are void if the product is sold to purchaser by unauthorized persons.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc via an authorized Thermal Arc repair facility within thirty (30) days of purchaser's discovery of any defect. Thermal Arc shall pay no transportation costs of any kind under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the Purchaser. All returned goods shall be at the Purchaser's risk and expense. This warranty dated July 1st 2007 supersedes all previous Thermal Arc warranties. Thermal Arc® is a Registered Trademark of Thermal Arc, Inc.

WARRANTY SCHEDULE

This information applies to Thermal Arc products that were purchased in the USA and Canada.

January 2009

SAFETY EQUIPMENT	WARRANTY PERIOD	LABOR
Auto-Darkening Welding Helmet (Electronic Lens)	2 years	2 years
Harness Assembly	1 month	1 month
ENGINE DRIVEN WELDERS	**WARRANTY PERIOD**	**LABOR**
Scout, Raider, Explorer		
Original Main Power Stators and Inductors	3 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
Engines and associated components are NOT warranted by Thermal Arc, although most are warranted by the engine	See the Engine Manufactures' Warranty for Details	
GMAW/FCAW (MIG) WELDING EQUIPMENT	**WARRANTY PERIOD**	**LABOR**
Firepower FP-95, FP-125, FP-135, FP-165 Fabricator 140, 180, 190, 210, 251, 281; Fabstar 4030; PowerMaster 350, 350P, 500, 500P, 320SP; 400SP; 500SP; Excelarc 6045. Wire Feeders; Ultrafeed, Portafeed		
Original Main Power Transformer and Inductor	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors.	1 year	1 year
GTAW (TIG) & MULTI-PROCESS INVERTER WELDING EQUIPMENT	**WARRANTY PERIOD**	**LABOR**
160TS, 300TS, 400TS, 185AC/DC, 200AC/DC, 300AC/DC, 400MST, 300MST, 400MSTP		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors.	1 year	1 year
PLASMA WELDING EQUIPMENT	**WARRANTY PERIOD**	**LABOR**
Ultima 150		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
Welding Console, Weld Controller, Weld Timer	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors, Coolant Recirculator.	1 year	1 year
SMAW (Stick) WELDING EQUIPMENT	**WARRANTY PERIOD**	**LABOR**
Thermal Arc 95 S		
Original Main Power Magnetics	1 year	1 year
Original Main Power Rectifiers, Control P.C. Boards	1 year	1 year
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans	1 year	1 year
160S, 300S, 400S		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
GENERAL ARC EQUIPMENT	**WARRANTY PERIOD**	**LABOR**
Water Recirculators	1 year	1 year
Plasma Welding Torches	180 days	180 days
Gas Regulators (Supplied with power sources)	180 days	Nil
MIG and TIG Torches (Supplied with power sources)	90 days	Nil
Replacement repair parts	90 days	Nil
MIG, TIG and Plasma welding torch consumable items	Nil	Nil

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